...OGY DEPT.

# INDIA RUBBER WORLD

## NATURAL & SYNTHETIC

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JANUARY, 1945

CABOT'S
Sterling-"S"
Semi-Reenforcing Furnace Black
Exceptionally Uniform Rubber Properties

A BILL BROTHERS PUBLICATION

Newsletter No. 1
JANUARY, 1945

Published by Rubber Chemicals Division of DUPONT

# POLYAC—A NEW VULCANIZING ACTIVATOR

GR-I VULCANIZATES of the highest quality are obtained through use of Polyac as a vulcanizing activator. The use of Polyac with Thionex as the vulcanizing agents for GR-I results in so much improvement in rate of cure, resistance to heat aging (steam, hot water or hot air), compression set and cold flow properties, that this combination is rapidly becoming the standard for such stocks.

OUTSTANDING FEATURES of Polyac-Thionex combinations are:

1. Stiffening of raw stock.
2. Faster curing.
3. Safer processing.
4. Increased resistance of stock to steam—air cycles in curing bags and steam hose.
5. Increased viscosity of GR-I cements.

POLYAC-THIONEX cured GR-I stocks are especially recommended for inner tubes, steam hose and tire curing bags.

POLYAC may be used in conjunction with regular accelerators (preferably of the Thiuram type) but we recommend its use with Thionex specifically because the combination of Polyac and Thionex provides additional safety in processing.

POLYAC-THIONEX cured GR-I stocks have exceptionally high stress-strain values at low elongations. The usual high deformation of GR-I compositions with low loadings can be almost completely overcome and the stress-strain curve of a properly balanced Polyac-Thionex accelerated GR-I stock is almost identical with that of a corresponding high quality natural rubber stock.

POLYAC stiffens GR-I and results in uncured compositions that have less tendency to collapse after tubing or thin out during the vulcanization of inner tubes. The increased stiffness of the uncured stock should not be confused with scorchiness. The effect is entirely different and, if undesirable, can be offset by the use of softeners.

Comparison of the physical properties of two typical GR-I stocks, one accelerated with Polyac-Thionex, and the other with MBT Thiuram M acceleration, is shown in Table I.

**TABLE I**

| | Compound 1 | Compound 2 |
|---|---|---|
| **Acceleration** | **Thiuram M 1.0%<br>MBT 0.5%** | **Thionex 1.0%<br>Polyac 0.5%** |
| **Plasticity-Recovery** | | |
| **Original** | **119-14** | **113-15** |
| **After 30 minutes at 250° F.** | **131-15** | **142-29** |
| **Set-Up Cure—30 min. at 250° F.** | **Porous** | **Porous** |
| **Physical Tests (10 min. at 298° F.)** | | |
| **Original** | | |
| **Modulus at 500% Elongation—psi** | **625** | **900** |
| **Tensile Strength at Break—psi** | **2125** | **2025** |
| **Elongation at Break—%** | **930** | **860** |
| **Hardness—Shore** | **56** | **47** |
| **Tear Strength at 100° C.—lbs. per in.** | **160** | **215** |
| **Permanent Set (ASTM)—%** | **290** | **155** |
| **After 48 Hours' Aging in Air at 100° C.** | | |
| **Modulus at 500% Elongation—psi** | **1300** | **1400** |
| **Tensile Strength at Break—psi** | **2175** | **2150** |

COLORS We have on hand stocks of all colors, both powdered and GR-S dispersed. Refer to Blue Report No. 156 for a complete description and list. If you have not yet had samples and wish them, please write us.

THIONEX is one of the most interesting, versatile, and economical accelerators for GR-S. Can be used alone, as a primary or as a secondary accelerator with excellent results. Try it.

GR-S TIRES The extensive tests that have been made give a background of service experience on tires accelerated with 2-MT-Accelerator 808 that confirms the faith in this accelerator combination and the wisdom of its choice. Our tire specialists will be glad to discuss these results with you.

BARAK Have you tried it as an activator in GR-S stocks?

**BUY WAR BONDS**

DUPONT
REG. U.S. PAT. OFF.

**RUBBER CHEMICALS DIVISION**

BETTER THINGS FOR BETTER LIVING . . . *Through Chemistry*

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ECHNOLOGY DEPT:


# QUALITY CONTROL FROM RAW MATERIAL TO YOU

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## K&M LIGHT MAGNESIUM OXIDE

You can depend on the quality of K&M Light Magnesium Oxide, because Keasbey & Mattison Company exercises complete manufacturing control from the raw material to the finished product. Result . . . uniform quality and economy for you.

Increased demands for K&M Light Magnesium Oxide have led to increased production facilities by Keasbey & Mattison. Same high standard of excellence . . . only now there's more available.

**KEASBEY & MATTISON**
**COMPANY, AMBLER, PENNSYLVANIA**

One of America's oldest and most reliable makers of asbestos and magnesia products. Founded 1873

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K&M best in asbestos

**OUR DISTRIBUTOR FOR K&M LIGHT MAGNESIUM OXIDE IS:**

**AMERICAN CYANAMID & CHEMICAL CORPORATION**

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CHICAGO, ILLINOIS, Herron & Meyer
LOS ANGELES, CAL., H. M. Royal, Inc.
TRENTON, N. J., H. M. Royal, Inc.

FOR A

# HAPPY NEW YEAR

USE

# PHILBLACK A

## the easy-processing, low hysteresis, new HMF type black

•

**PHILLIPS PETROLEUM COMPANY**

**Philblack Division**

**First Central Tower—Akron, Ohio**

(HAVE YOU ENTERED THE CHICAGO RUBBER GROUP CONTEST?)

"In your plans for 1945 - take advantage of the complete NAUGATUCK CHEMICAL line of Rubber Chemicals and Reclaims"

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● **ACCELERATORS**
Thiazoles — Thiurams — Dithiocarbamates — Aldehydeamines — Xanthates

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● **SPECIAL PRODUCTS**
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A Complete Line of Natural Rubber Reclaims and for Your Future Compounding Naugatuck Has Available Synthetic Reclaims from GR-S — Neoprene — Buna N — Butyl

**PROCESS • ACCELERATE • PROTECT**

**Naugatuck Chemical**
DIVISION OF UNITED STATES RUBBER COMPANY
ROCKEFELLER CENTER NEW YORK 20, N. Y.
IN CANADA: *Naugatuck Chemicals Division, Dominion Rubber Co., Elmira, Ont.*

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## HIGH-PRODUCTION PRESSES

SIDE SLAB PRESS FOR HARD RUBBER MOLDING

Baldwin presses confine heat within molds and steam plates, assure positive guiding and have greater rigidity. Users collect dividends in lower maintenance. Baldwin Southwark Division. The Baldwin Locomotive Works, Philadelphia, Pa., U. S. A. Offices: Philadelphia, New York, Chicago, Washington, Boston, Cleveland, St. Louis, San Francisco, Houston.

**BALDWIN PRODUCTS FOR THE PLASTICS MOLDING FIELD**

*Rubber Shears...Vertical and Horizontal Vulcanizers...Sole and Heel Presses...Steam Platen Presses...Belt Presses...Rolled Steel Steam Platens for Presses*

BLW THE BALDWIN GROUP

**BALDWIN**

**SOUTHWARK**

**HYDRAULIC PRESSES**

# Hycar

Reg. U. S. Pat. Off.

# synthetic rubbers now off WPB allocations

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

EFFECTIVE January 1, 1945, Hycar OR-15, Hycar OR-25, and Hycar OS-10 are no longer subject to allocation by the War Production Board.

The provisions of Rubber Order R-1 regarding end use and inventory are now applicable to Hycar, the same as to any other general purpose rubber.

All you have to do to get these materials now is to place your order directly with us.

It is no longer necessary to order your Hycar requirements on a monthly basis. By ordering as you normally would, you will help level off our first-of-the-month peak and increase our ability to handle your order promptly.

As usual, Hycar's Technical Service Staff is at your service, ready to help you with your individual problems. *Hycar Chemical Co., Akron 8, Ohio.*

★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★ ★

Hycar

Reg. U. S. Pat. Off.

LARGEST PRIVATE PRODUCER OF BUTADIENE TYPE

Synthetic Rubbers

# To Identify the Four Divisions of National-Standard Company

WHEN you see this trade mark on a product, it is a positive guarantee of unvarying quality, superior performance, and absolute dependability. More than that, it stands for the helpful engineering cooperation, the careful study of customer's problems, and the constant progress in developing new improvements, that is an inherent policy of each of National-Standard's four divisions.

Although you, in the Rubber Industry may be familiar with one or two of the Divisions of National-Standard, the trade marks shown here will help identify the others that may be able to serve you with their particular products, experience, and helpful interest.

### NATIONAL-STANDARD COMPANY
NILES, MICHIGAN

*Wire Braids flat and tubular in Steel or other metal. Tapes and Specialized Wire Products for Tire Beads, Steam Hose Armor, Reinforcement for Oil Well Drilling Hose. Braided Covering for Flexible Tubing, Aircraft and Tank Radio Shielding. Stranded Wire for reinforcing Flat and V Belts. Braided Covering for Electrical Cables. Drawn wire in small sizes down to .002, Steel, Aluminum, Brass, Monel, Nickel Silver, Stainless Steel, Phosphor Bronze and other Alloys.*

### WORCESTER WIRE WORKS, DIVISION
WORCESTER, MASS.

*High quality Wire in small diameter sizes, down to .006. Round, Flat, Square, Special Shapes, Low and High Carbon Steel. Annealed, Hard Drawn, Tempered, Bright, Liquor Finish, Tinned, Copper Coated, Cadmium Coated, Galvanized.*

### THE ATHENIA STEEL COMPANY, DIVISION
CLIFTON, NEW JERSEY

*Cold Rolled, High Carbon Flat Steels in widths of 1/16" to 6 1/2", Thickness .0015 to .062 Custom-made Steels—.60 Carbon and higher. Entire range of Annealed, Hard Rolled, Black Tempered, Tempered and Polished or Tempered and Polished with Blue or Straw Colored finish, Best quality Small Flat Springs.*

### WAGNER LITHO MACHINERY CO., DIVISION
HOBOKEN, NEW JERSEY

*Complete lines of automatic equipment—designed, manufactured and installed for can companies and others using sheets in the metal decorating trade. Individual units consist of Roller Coating Machines, Conveyor Type Ovens and Auxiliary Equipment for tandem operation with lithographing presses, etc.*

**BUY AND KEEP WAR BONDS AND STAMPS**

# Yes . . .

# THERE IS A NAME FOR IT

## That name is

# MULTI-PLAST

IT IS MADE by the originators and leaders in the field of sulfur-reactive plasticizers.

IT IS MADE especially for *you* as a primary product — *not* as a by-product.

IT IS MADE by large-scale production methods that bring it into the low-priced field.

IT IS MADE under rigid supervision to insure uniformly high quality.

MULTI-PLAST is brought to you by our technical representatives, experienced men with a know-how in rubber compounding. They can give you helpful suggestions on the use of MULTI-PLAST for low-cost high-quality compounding.

***WILCHEM PRODUCTS:*** NAFTOLEN • MULTI-PLAST • ECONO-PLAST • NAFTEX
NAFTOLEN EMULSION • WILMEX • WILCOR RECLAIMING OILS • POLY-TINT

*The booklet, "TENSILE STRENGTH TABLE", designed as an aid in your physical testing laboratory is available. Write for your copy.*

W C=C

REG. U. S. PAT. OFFICE

# WILMINGTON

## CHEMICAL CORPORATION

10 EAST 40TH STREET • NEW YORK 16, N. Y.

# HERE IS A PRIZE CONTEST Any One Can Enter!..

Yes, regardless of who you are or where you live within the boundaries of the United States or Canada, you may enter this great contest to aid America solve a perplexing problem — how best to utilize synthetic rubber scrap. Be sure to read every detail of this contest as explained below . . . then decide to enter and compete for one of these worthwhile prizes.

A group of rubber technologists identified with the rubber industry, known as the Chicago Rubber Group, is offering three prizes, totaling $1000.00 for the best papers on the utilization (reclaiming and processing) of cured synthetic rubber scrap. While the papers may deal with any phase of the problem, here are some subjects which suggest themselves: 1. Separation and segregation of synthetic scrap rubber. 2. Methods of identification of synthetic scrap rubber. 3. Reclaiming of synthetic scrap rubber. 4. Compounding studies which will result in greater use of reclaimed synthetic scrap, or of ground synthetic scrap rubber.

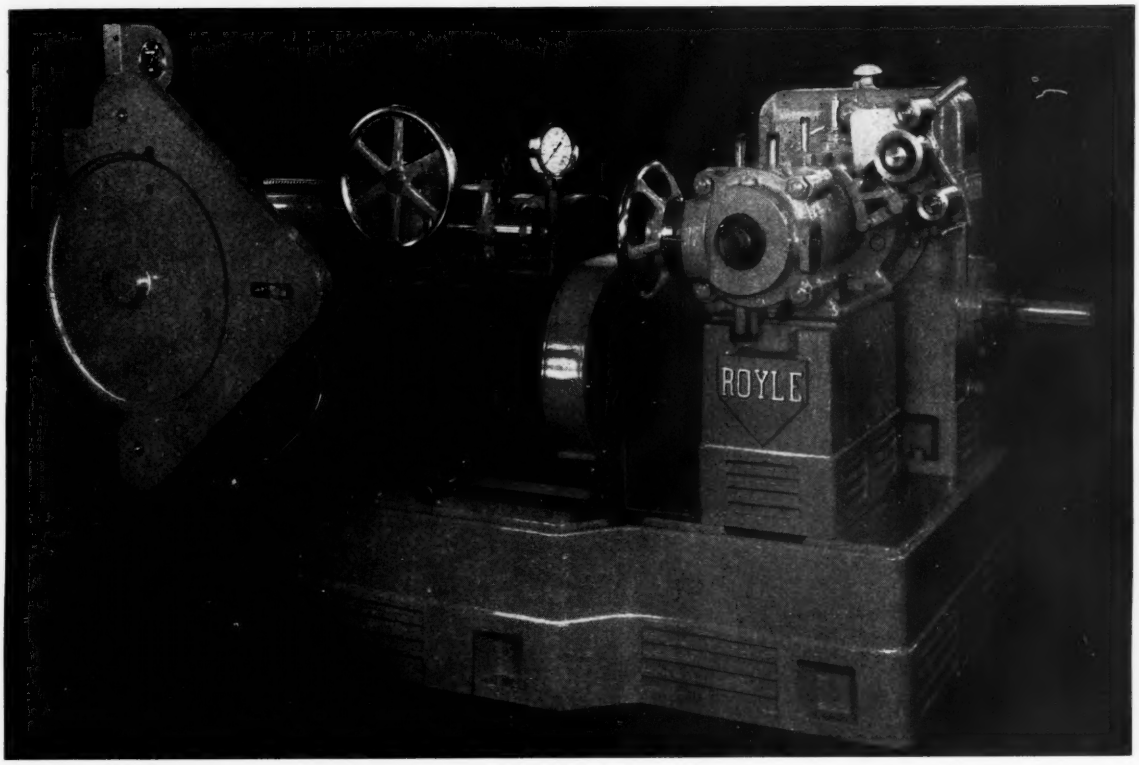
First prize: $500.00; second prize: $300.00; third prize: $200.00. If you feel that you have ideas of value for this contest, be sure to enter! You may win one of these substantial cash prizes.

## READ THESE SIMPLE CONTEST RULES:

This contest is open to anyone in the United States or Canada excepting officers and directors of the Chicago Rubber Group for 1943-45. Selection of subject matter is left to the discretion of the contestant. As many papers as desired may be submitted by any one contestant. Papers should be based upon information which has not previously been presented before any technical society meeting or published in any trade magazine. Contest closes at midnight on August 1, 1945. Awards will be made during the fall meeting of the American Chemical Society in Chicago, 1945. The decision of the judges will be final. Each author must submit three copies of his paper to Mr. A. R. Floreen, Vice-President City National Bank & Trust Company, 208 S. La Salle St., Chicago. These three copies will be judged separately by the Rubber Manufacturers Association, the Rubber Reclaimers Association and the Rubber Division of the American Chemical Society. The judges will report their findings to Bruce W. Hubbard, Chairman Chicago Rubber Group, 2512 W. 24th Street, Chicago, to whom all inquiries for additional information should be addressed.

## Sponsored by CHICAGO RUBBER GROUP, Chicago

*Space donated by THE LOEWENTHAL CO.*




**No. 2 Royle Continuous Vulcanizing Machine**

## "ANY INSULATION" WON'T DO
## When You're Fighting A Global War

"Fifteen hours after 'things' had quieted down we were using the airstrip. - - - run telephone lines to the important stations and installed field sets. That night - - - lines and many other things were blown to bits."

That is the way it is on fighting fronts around the world. It is to the credit of American ingenuity and industry that material and equipment to maintain communications under such conditions is available in sufficient quantities.

Today Royle Continuous Vulcanizing Machines are delivering insulated wire in many of the nation's wire processing plants—"enough and on time."

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# *Serving Dependably—*
# *Speeding Production*

★

★ **ADVAN**—New delayed action accelerator recommended for GR-S for footwear, hose covers, CV insulation, etc.

★ **ADVAGUM**—Synthetic thermoplastic used to assist processing of Buna N type synthetics.

★ **ADVAWET**—Series of powerful wetting out and emulsifying agents. Also suitable for stabilizing synthetic latices and dispersions.

★ **COPPER NAPHTHENATE**—Powerful mildewproofing agent. Meets all Armed Forces' specifications.

★ **EXTENDER 15**—Extender for dibutyl phthalate and other plasticizers. Readily available.

★ **OROPLAST**—Extender and softener with outstanding smoothening quality when used with GR-S compounds for calendering, tubing and skim coating.

★ **PLASTOFLEX**—Series of efficient plasticizers for vinyl chloride resins. Good low temperature flexibility.

★ **PLASTOFLEX 10**—Replacement for dibutyl phthalate in Buna N type synthetics. Gives high resilience.

★ **PLASTICIZERS VA**—Plasticizer for vinyl acetate polymers as replacements for latex and for shoe adhesives.

★ **PLASTAC**—Tackifier and plasticizer for GR-S.

★ **RESIN V**—Tackifier for GR-S, also in adhesive work with GR-S latices.

★ **VISTAC**—Series of hydrocarbon polymers being used as tackifiers and processing aids for GR-S, Vistanex Polybutene and other rubbers.

★ **VISTANEX POLYBUTENE** — Isobutylene polymers for special purpose GR-S and synthetic insulation compounding. Outstanding for pressure-sensitive adhesive bases.

★ **ZINC NAPHTHENATE**—Colorless mildewproofing agent for fabrics such as duck, braid, etc. Meets government specifications.

★

## ADVANCE SOLVENTS & CHEMICAL CORPORATION

245 Fifth Avenue, New York 16, N. Y.

WHEN the war ends and you are again in business for yourself, making rubber products for peacetime consumption, we want you to take advantage of all that Philadelphia Rubber has to offer. We want you to profit from our *new* knowledge of reclaim compounds, gained through the accelerated and far-reaching research made necessary by the war.

For example, Philadelphia Rubber development has established the facts that reclaim is just as compatible with GR-S as it was with natural rubber; that the compounding of GR-S with reclaim makes possible faster mixing and faster cures. This means lower cost of your finished product which will make your sales position better in the competitive market that is sure to return.

No organization in this country is better equipped to help you with problems involving the use of reclaim. We sincerely invite you to make use of our experience, our laboratory staff and facilities in solving any reclaim problems that you may have now or in the future. The Philadelphia Rubber Works Company, 324 Rose Building, Cleveland 15, Ohio.

**PHILADELPHIA**
**RECLAIMED RUBBER**

*for* **INSULATED WIRE**

**Tensile Strength**

**Resistance to aging**

**Dielectric strength**

***Write Our Technical Service Dept. for Details***

**MOORE & MUNGER**

**33 RECTOR STREET - NEW YORK CITY**

# BELL TELEPHONE LABORATORIES

***Exploring and inventing, devising and perfecting for our Armed Forces at war and for continued improvements and economies in your telephone service***

RESEARCH, in the Bell Telephone System, has always been an expanding activity, growing with the scientific knowledge of the times and contributing to that knowledge. Upon it have been based important inventions and developments.

The telephone, itself, was invented in the laboratory where Alexander Graham Bell was carrying on researches in speech and hearing and laying the foundation for the electrical transmission of speech. As time went on the telephone research program expanded to cover every science which gives any promise of improved telephony and every engineering art which applies to the development, construction, installation and operation of telephone facilities.

These researches and development studies now cover electrical communication of speech—both by wire and by radio—the transmission of pictures (television)—and many important projects for war.

### *There Is No End to Progress*

Every new research gives rise to new inventions and to new lines for development and design. New inventions indicate new lines for more research. Research and development work, invention and design go hand in hand. In the early years, this work was carried in part by the American Telephone and Telegraph Company and in part by the Western Electric Company, the manufacturing unit of the Bell System.

For many years, however, this work has been assigned to a specialized unit, Bell Telephone Laboratories, Incorporated. Theirs is the responsibility for the technical future of the industry. They carry their developments from the first faint glimmerings which basic researches disclose to the final design of equipment and the preparation of specifications for its manufacture. And after manufacture and installation, they follow their products in operation; and continue development work to devise still more perfect equipment, less expensive, more convenient and of longer useful life.

These policies and procedures of Bell Telephone Laboratories are distinguished by two characteristics. In the first place the Laboratories design for service. The consideration is not the profit of a manufacturer through first sales and replacement models but the production of equipment which will give the best service at the lowest annual cost when all factors are considered, such as first cost, maintenance, operation, and obsolescence. The Laboratories make no profit and the equipment they design is owned and used by the telephone companies; and the emphasis is upon that use.

### *Organized Co-ordinated Research*

In the second place the Laboratories design always with reference to the complete communication system in which the particular equipment is to play a part.

Reliable, economical telephone service, which is the product of its efforts, is not so much an assemblage of excellent apparatus as it is an excellent assembly of co-ordinated equipment—all designed to work together reliably and economically for a larger purpose.

It is not enough that Bell Laboratories shall design a new piece of electronic equipment which has merit or a new cable or telephone receiver. They must design with reference to all the other parts of the communication system so that the co-ordinated whole will give the best possible service.

### *4600 People in Bell Laboratories*

Bell Laboratories contributions to the Armed Forces derived in large part from the technical background that the Laboratories had acquired through their steadily maintained program of research. The Laboratories had special knowledge, skill and techniques which could instantly be diverted to war problems.

At the time of Pearl Harbor, over a quarter of the 4600 people in the Laboratories had twenty or more years of service. This breadth of background made possible many engineering developments outside the strict field of communication and these have been of value to the Armed Forces. So far the Armed Forces and the O.S.R.D. have engaged the Laboratories on over a thousand major projects. The majority of these assignments have been completed; and have contributed to our victories on many fronts.

Most of the Laboratories developments, of course, have been in the field of electrical communication. Communication, not simply between individuals as in ordinary telephony, but between mechanisms—as in the electrical gun director. The Laboratories techniques and electronic researches have produced many secret weapons for our country's Armed Forces.

### *Leader in Electronic Development*

For those problems the Laboratories had a remarkable background of experiences in research and development. In World War I, they pioneered by developing radio telephone systems for talking between planes and between planes and ground stations. They also contributed methods and devices for locating enemy planes, submarines, and artillery.

In this war, Bell Laboratories have pioneered in the field of electronics. The Western Electric Company, which manufactures the designs of the Laboratories, is the largest producer of electronic and other war communication equipment in the United States and is now engaged almost exclusively in the manufacture of this equipment.

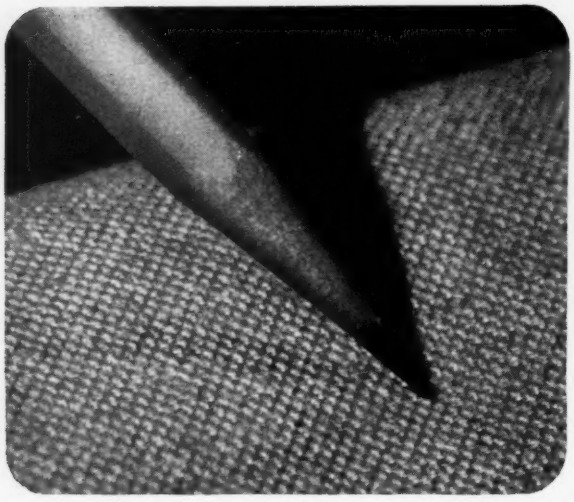
In war, Bell Telephone Laboratories devote their work to the needs of our Armed Forces. In peace, they are constantly exploring and inventing, devising and perfecting for continued improvements and economies in telephone service. Centralized research is one of the reasons this country has always had "the most telephone service and the best at the least cost to the public."

BELL TELEPHONE LABORATORIES

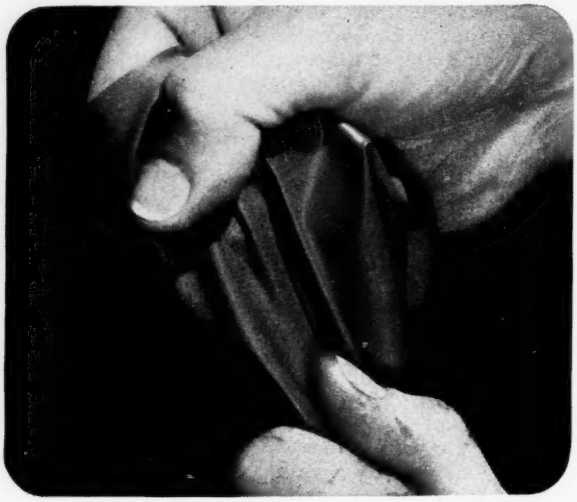
# Use UBS COMPOUNDS for BACKING, COMBINING, COATING

*"and do the Job Better"*

● In Combining operations, UBS developed Buna Latex Compounds provide a positive one-coat bond, good flexibility, and excellent moisture resistance and ageing qualities. Outstanding in this field is UBS's Formula CT-456-B, which has been extremely successful on the can drier machine.



● When used for Backing, UBS developed Buna Latex Compounds lock the pile firmly to the fabric base, provide good flexibility and ageing, and withstand dye bath temperatures without deterioration. A variety of thoroughly tested formulas, developed for specific problems, are available.



● When used for Coating, UBS developed Compounds form a tough, flexible, contiguous film. A variety of formulas, based upon Ubatex (an original UBS synthetic), Buna, Neoprene, etc., are available. In most instances, special compounding to meet individual requirements is advisable.

Long-time specialists in the fields of Combining, Coating and Impregnating Compounds, the UBS Laboratories are constantly working with all the latest synthetics (Buna, Neoprene, Vinylite, etc.). Recent UBS developments include formulas for an original synthetic latex and a totally new synthetic rubber.

*Write today, describing your Backing, Combining and Coating Problems.*

Address all inquiries to the Union Bay State Chemical Company, Rubber Chemicals Division, 50 Harvard Street, Cambridge 42, Massachusetts.

UBS

UNION BAY STATE *Chemical Company*

*Serving Industry with Creative Chemistry*

ORGANIC CHEMICALS · SYNTHETIC LATEX · SYNTHETIC RUBBER
PLASTICS · INDUSTRIAL ADHESIVES · DISPERSIONS
COATING COMPOUNDS · IMPREGNATING MATERIALS · COMBINING CEMENTS

# Turn Back the Clock to 1920

Compare this view of Manhattan as it looked in 1920 with the way it looks today. Twenty-five years have made a difference... the city has moved forward... grown bigger... taller... and the story of its progress is etched in its skyline.

Organized in 1920, the Witco Chemical Company, too, has grown swiftly and steadily... from a small office with a personnel of four to a world-wide organization. Now entering its second quarter of a century with a list of more than 200 chemicals, oils, pigments, asphalts, and other products, Witco is prepared to meet the chemical requirements of a fast expanding industrial world.

Witco invites you to test the quality of its products... to use the facilities of its modern research laboratory and the services of its experienced research staff.

**WITCO'S WITCARB R**

*One of Many Quality-Sure Witco Products Contributing to Chemical Progress*

Witcarb R is a white pigment of extremely small particle size that provides an excellent reinforcing Pigment in Hycar and Neoprene, Butyl & GR-S. It produces excellent physical properties, good tensile and tear resistance—but it must be mixed well, as carbon black must be, for satisfactory results. Recommended processing procedure will be sent upon request.

## WITCO CHEMICAL COMPANY

*MANUFACTURERS AND EXPORTERS*

**[Formerly Wishniek-Tumpeer, Inc.]**

295 MADISON AVENUE, NEW YORK 17, N. Y.

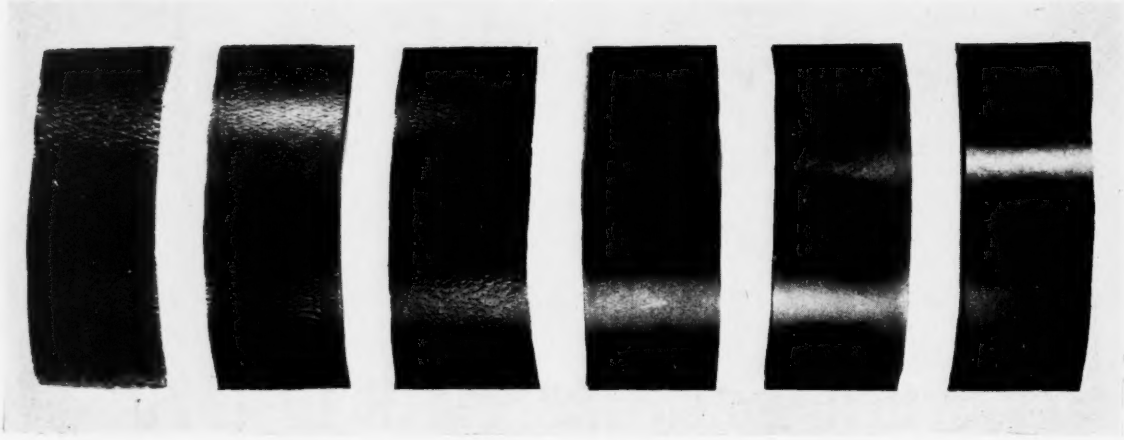
*Boston • Chicago • Detroit • Cleveland • Akron • London*

# ANTISOL

*WILL PROTECT GR-S AGAINST*

*ATMOSPHERIC CRACKING*

**EXPOSED TO DIRECT SUNLIGHT FOR 50 DAYS**

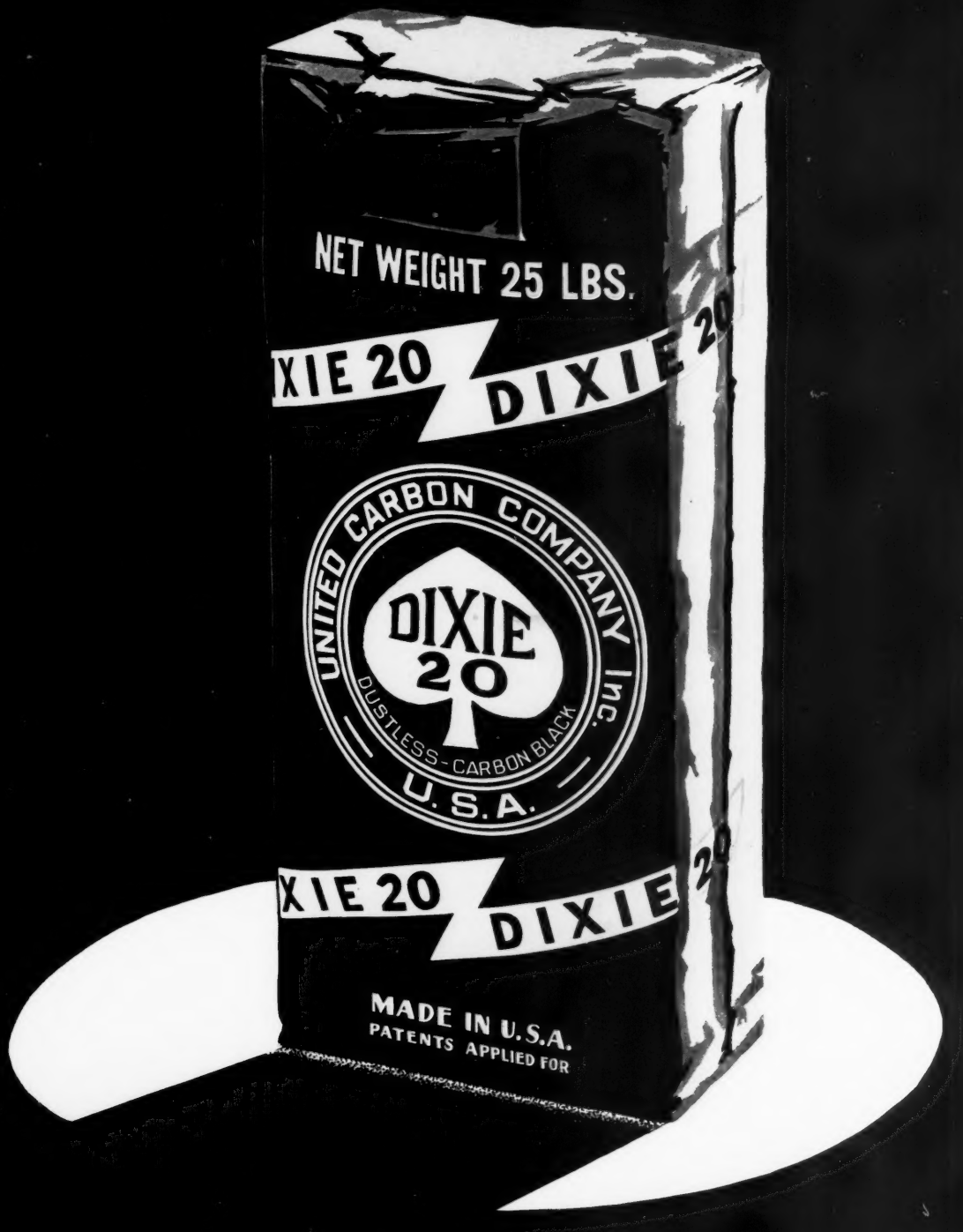


| Control (no wax) | Paraffin 4% | Antisol 1% | Antisol 2% | Antisol 3% | Antisol 4% |
|---|---|---|---|---|---|

## HERRON BROS. & MEYER

82 Beaver Street, NEW YORK 5, N. Y.

516 Ohio Bldg., AKRON, OHIO


NET WEIGHT 25 LBS.
DIXIE 20
UNITED CARBON COMPANY Inc.
DIXIE 20
DUSTLESS - CARBON BLACK
U.S.A.
DIXIE 20
MADE IN U.S.A.
PATENTS APPLIED FOR

# DIXIE 20

DIXIE 20 is a semi-reinforcing (SRF) type carbon black made by United's special furnace process.

IDEAL for the GR-S and other rubbers used in military and civilian goods.

OUTSTANDING for ease of processing, good plasticity, fast rate of cure, high resiliency, and low heat build-up.

WELL-KNOWN for uniform quality and performance.

RECOMMENDED for blending with channel black for moderate reinforcement and low heat build-up.

DIXIE 20 is a Strong Rubber Favorite.

RESEARCH DIVISION

**UNITED CARBON COMPANY, INC.**

Charleston, West Virginia

In t
Picc
getti
able
ther
prov
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read
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# Piccolastic resins

**Based on Styrene, substituted Styrenes and Homologues**

**Provide new and improved characteristics**

**PICCOLASTIC GRADES**
Piccolastic Resins · Number Schedule

| A Soft Plasticizing | B Hard Brittle | C Flexible | D Hard Tough | E Flexible to Tough | F Hard Horny in Solvent |
|---|---|---|---|---|---|
| A-5 | .... | C-5 | .... | .... | .... |
| A-25 | .... | C-25 | .... | .... | .... |
| A-50 | B-50 | C-50 | .... | E-50 | .... |
| A-75 | B-75 | C-75 | D-75 | E-75 | .... |
| .... | B-100 | C-100 | D-100 | E-100 | .... |
| .... | .... | C-125 | D-125 | E-125 | .... |
| .... | .... | .... | D-150 | .... | FT. FX, FHF |

KEY TO NUMBERING CHART:—The numbers opposite each of the letters refer to the approximate Melting Point of the resin in °C, Ball and Ring Method. All members of the A, B, C, D and E series are solid resins, containing all non-volatile matter.
The F series each contains 55% of a resin of approximately 150°C melting point, dissolved in 45% of an aromatic solvent. FT contains Toluol (when available), FX contains Xylol and FHF contains High Flash Naphtha.

PICCOLASTIC
STYRENE, SUBSTITUTED STYRENE AND HOMOLOGUES

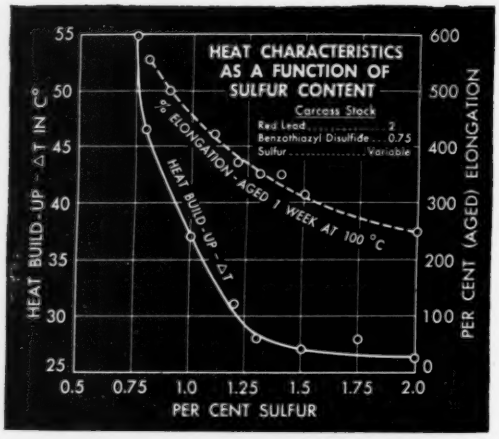
In the rubber industry, the new Piccolastic Resins offer a means of getting results hitherto unobtainable. The various types of these thermoplastic hydrocarbon resins provide an almost unlimited range of properties because they may be readily intermixed or combined with other plastic bodies. Most are pale color, suitable for the majority of uses. Molecular weights, solvencies, melting points and other physical properties vary in the several types, over a wide range, but are fixed and dependable for any one type.

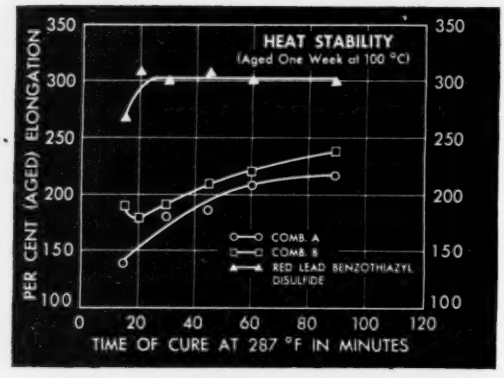
Preliminary investigations have shown decided advantages are to be gained by the use of Piccolastic Resins for rubber compounding, plasticizing and extending, for making adhesives and laminating agents of many types, electrical insulating materials and other products. Additional fields in which Piccolastic provides desirable characteristics will occur to the manufacturer investigating newly developed materials or processes for future use.

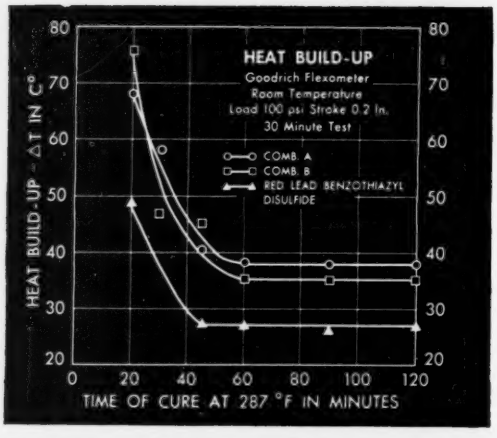
Extensive knowledge of resin syntheses and their application to the requirements of the rubber industry have been gained by our staff through years of research and field experience. This knowledge is available to help you make most effective use of Piccolastic in your operations.

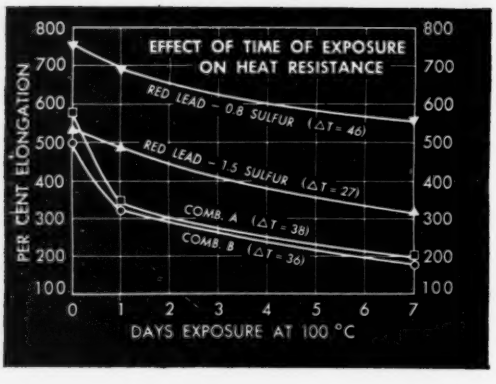
Write for descriptive bulletin giving complete data and physical properties of Piccolastic.

**PENNSYLVANIA INDUSTRIAL CHEMICAL CORPORATION**
**CLAIRTON, PA.**
Makers of: Coumarone Resins · Coal Tar Naphthas · Rubber Plasticizers · Reclaiming Oils · Terpene Resins
*Distributed to the rubber industry by Standard Chemical Co., Akron, Ohio*


HEAT CHARACTERISTICS AS A FUNCTION OF SULFUR CONTENT
Carcass Stock
Red Lead ..... 2
Benzothiazyl Disulfide .... 0.75
Sulfur ..... Variable
% ELONGATION - AGED 1 WEEK AT 100 °C
HEAT BUILD-UP - ΔT
HEAT BUILD-UP - ΔT IN C°
PER CENT (AGED) ELONGATION
PER CENT SULFUR


HEAT STABILITY
(Aged One Week at 100 °C)
COMB. A
COMB. B
RED LEAD BENZOTHIAZYL DISULFIDE
PER CENT (AGED) ELONGATION
TIME OF CURE AT 287 °F IN MINUTES





EFFECT OF TIME OF EXPOSURE ON HEAT RESISTANCE
RED LEAD - 0.8 SULFUR (ΔT = 46)
RED LEAD - 1.5 SULFUR (ΔT = 27)
COMB. A (ΔT = 38)
COMB. B (ΔT = 36)
PER CENT ELONGATION
DAYS EXPOSURE AT 100 °C

# Heat build-up and heat stability... both improve when you compound GR-S with RED LEAD

Have you had difficulty making your GR-S carcass stocks both heat resistant and cool running?

If so, try the right combination of red lead, benzothiazyl disulfide and sulfur.

Its acceleration is sufficiently active and efficient to provide—concurrently—heat stability and low heat build-up.

Note the following table and the accompanying charts.

**FORMULA**

| | |
|---|---|
| GR-S (Institute) | 100 |
| S.R.F. Black | 30 |
| Zinc Oxide | 3.0 |
| Paraflux | 7.5 |
| No. 2 R.M. Red Lead | 2.0 |
| Benzothiazyl Disulfide | 0.75 |
| Sulfur | 1.5 |

**Physical Properties**

| T/287° F. | Tensile Strength | % Elong. | T-300 | Shore | △T° in C° |
|---|---|---|---|---|---|
| 15 | 1520 | 860 | 315 | .... | .... |
| 20 | 1630 | 780 | 390 | 46 | 49 |
| 30 | 1450 | 630 | 520 | 47 | 47 |
| 45 | 1330 | 530 | 570 | 47 | 27.5 |
| 60 | 1210 | 480 | 520 | 47 | 27 |
| 90 | 1130 | 500 | 590 | 47 | 26 |
| 120 | 1100 | 500 | 610 | 47 | 28 |

| | Aged One Week at 100° C. | | | Aged 48 Hours at 100° C. | |
|---|---|---|---|---|---|
| T/287° F. | Tensile Strength | % Elong. | T-300 | Shore | △T° in C° |
| 15 | 910 | 270 | ..... | .... | .... |
| 20 | 1080 | 320 | 1000 | 54 | 30.5 |
| 30 | 990 | 300 | 990 | 54 | 30.5 |
| 45 | 1050 | 310 | 1000 | 53 | 29.5 |
| 60 | 1130 | 300 | 1090 | 53 | 26 |
| 90 | 1090 | 300 | 1090 | 53 | 25 |
| 120 | 1160 | 340 | 1100 | 53 | 25 |

** Goodrich Flexometer operated at room temperature. 30 minute tests. Load 100 psi, stroke 20%.*

## SUMMARY OF ADVANTAGES

1. Imparts improved heat resistance—retention of elasticity.
2. Imparts improved heat build-up—cooler running.
3. Relatively faster curing rate.
4. Safe processing.
5. Excellent general physical properties.
6. Broad curing plateau—very little change in properties on overcures.
7. Economical.
8. Available.

The charts illustrated are taken from a report on recent experimental work by the Rubber Division of our Research Laboratories on the problem of heat build-up and heat stability in GR-S stocks. Write for your copy. The report is titled, "The Heat Problem in GR-S Carcass Stocks."

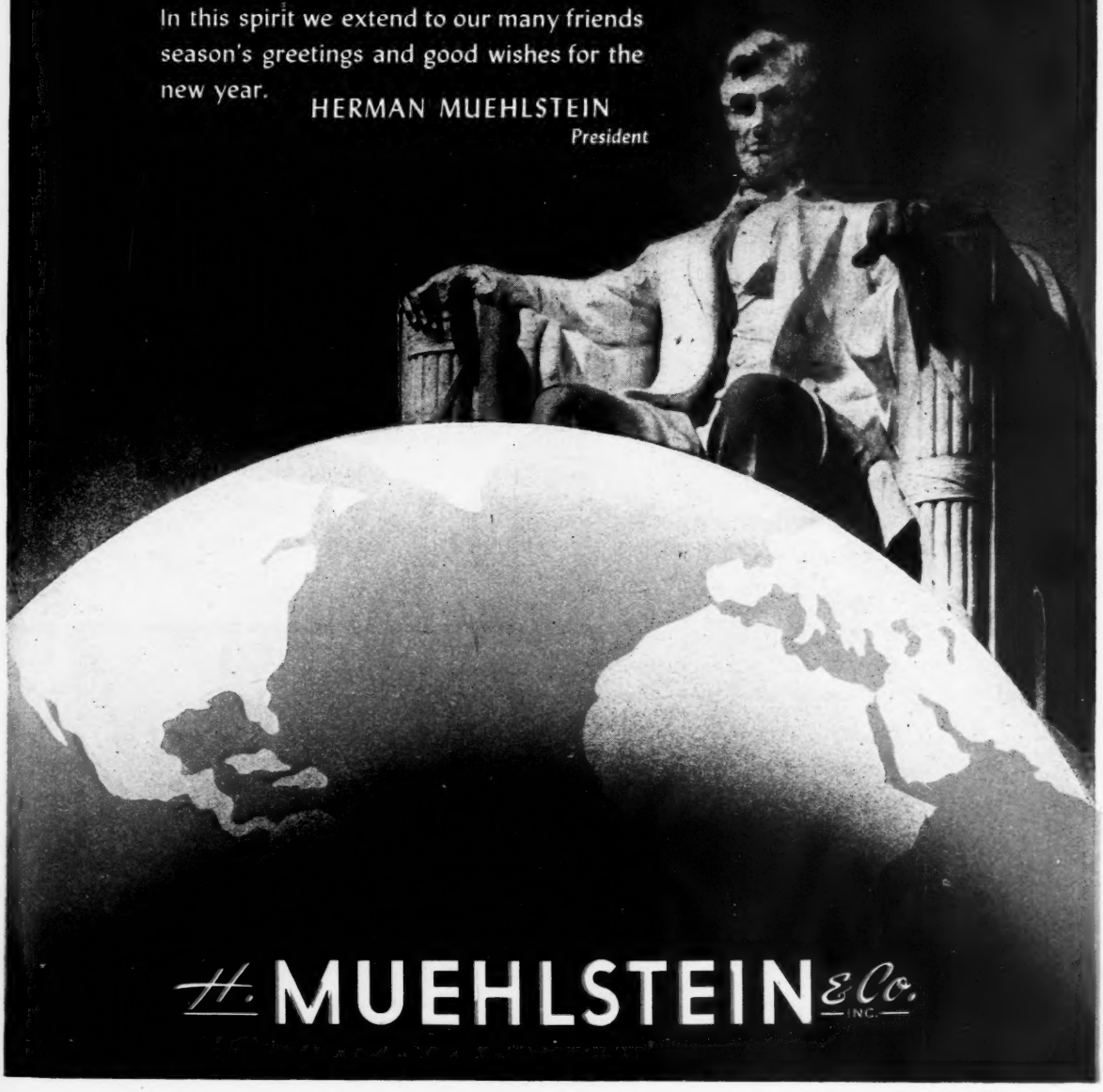
**NATIONAL LEAD COMPANY** New York, Buffalo, Chicago, Cincinnati, Cleveland, St. Louis, San Francisco; Boston (National-Boston Lead Co.); Pittsburgh (National Lead & Oil Co. of Penna.); Philadelphia (John T. Lewis & Bros. Co.).

# OUR WISH *for* 1945

In this soul searching period of trial—with our country dedicated to the great task of restoring to mankind its birthright of freedom—it is our wish and prayer that 1945 will see the ideals of the great emancipator established throughout the world.

In this spirit we extend to our many friends season's greetings and good wishes for the new year.

HERMAN MUEHLSTEIN
*President*



H. MUEHLSTEIN & Co. INC.

*announcing:*

# AN IMPORTANT FORWARD STEP IN CALENDER DESIGN

SINCE the earliest days of the rubber industry, Farrel-Birmingham engineers have worked to promote higher product quality and lower manufacturing costs through the development of more efficient processing equipment. Latest in a long line of pioneering achievements are the individual screw adjustments and other improvements built into this four-roll double coating calender.

Individual motors are provided for each screw of the top, bottom and side rolls. This means that a screw can be operated independently to adjust one end of a roll, but can also be synchronized with the one at the other end for parallel adjustment.

This new design permits precision control of gauge, either automatically or manually. The gauge can be instantly corrected to maintain uniform thickness at the edges — a definite advance in calender design.

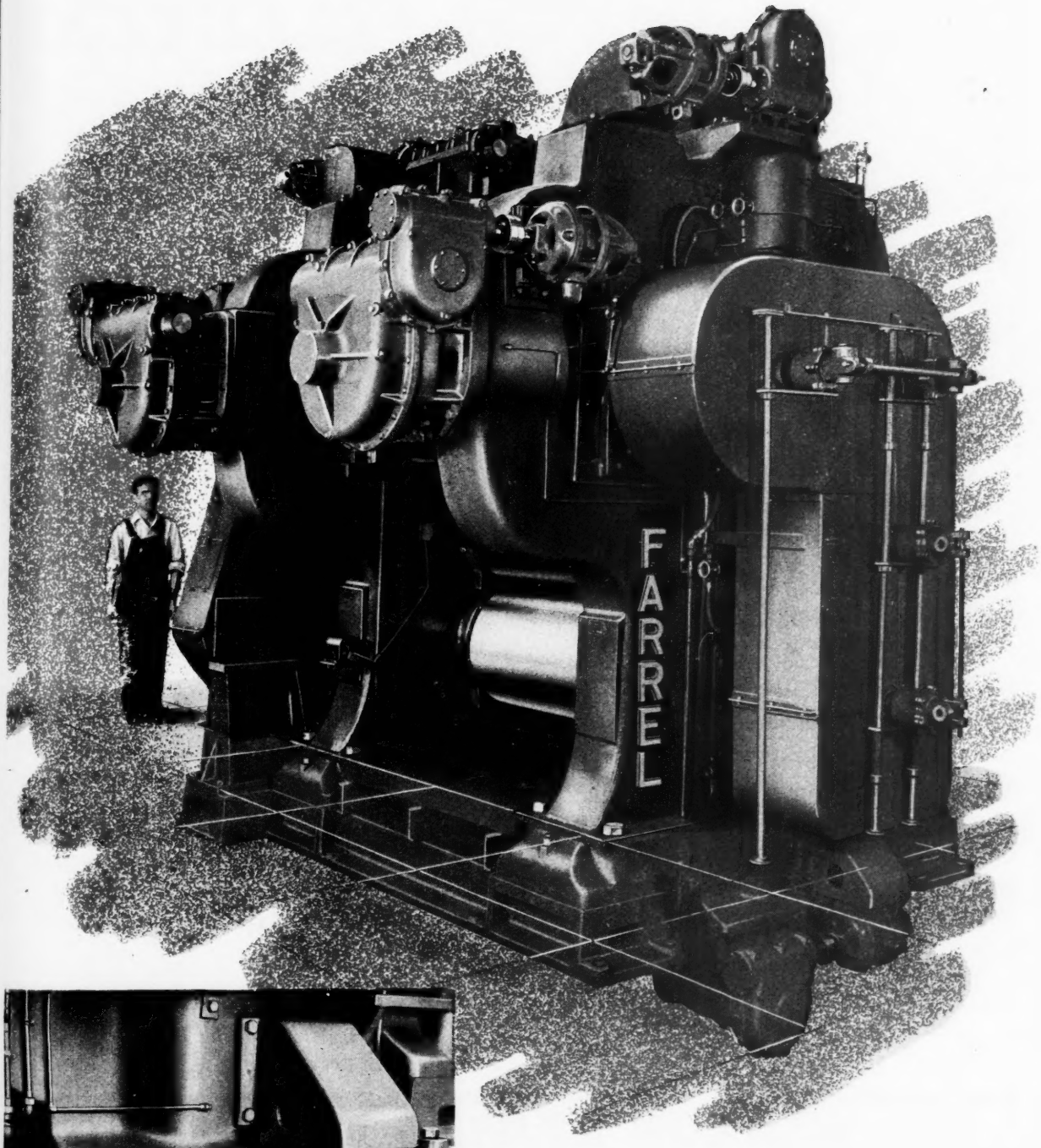
The calender is proportioned in size and weight to the large rolls, which offer more than three times the resistance to deflection ordinarily provided. Effective lubricating systems for the various moving parts contribute to higher operating efficiency, reduced maintenance and longer life.

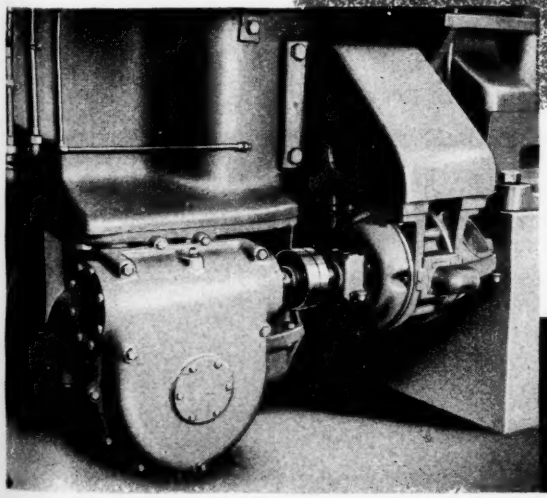
Farrel-Birmingham engineers will be glad to explain how this new contribution to product improvement can be put to work for you. Write for detailed information.

**PIONEERING**

*Other Farrel-Birmingham pioneering achievements include the Banbury Mixer, the Gordon Plasticator, the Hale Pelletizer, and important improvements in roll mills, tubing machines, bale cutters and other equipment used in processing natural and synthetic rubber.*

*Farrel-Birmingham*



**FARREL-BIRMINGHAM COMPANY, INC., ANSONIA, CONN.**
Plants: Ansonia and Derby, Conn., Buffalo, N. Y.
Sales Offices: Ansonia, Buffalo, New York, Pittsburgh, Akron, Los Angeles

# PELLETEX
## and
# GASTEX
## for
## Special Service
## FOOT WEAR

*Photo*
*Courtesy*
*U. S. RUBBER CO.*

The sea boot here illustrated has been designed to help men keep their feet warm and secure on the slippery decks of submarines. It is an excellent example of the resourcefulness of the technicians in producing rubber footwear for severe and specific war service. It has been the privilege of General Atlas to cooperate with manufacturers in the development of suitable rubber and synthetic compounds for these special purposes.

The advantages of GASTEX and PELLETEX (dustless GASTEX) Semi-Reinforcing Blacks for waterproof footwear are well-known and outstanding. These properties include easy processing, excellent dispersion and splendid aging producing compounds that stay soft, flexible, and resistant to cracking.

*You are invited to consult our technical staff at all times.*

**HERRON BROS. & MEYER**
**OHIO BLDG., AKRON, OHIO.**
GENERAL SALES AGENTS FOR
**GENERAL ATLAS CARBON**
**PAMPA, TEXAS — GUYMON, OKLA.**

GASTEX TRADE MARK

PELLETEX TRADE MARK

DISTRICT SALES AGENTS

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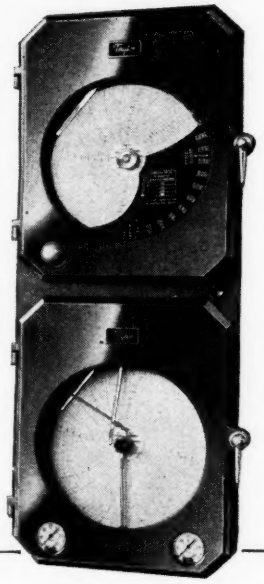
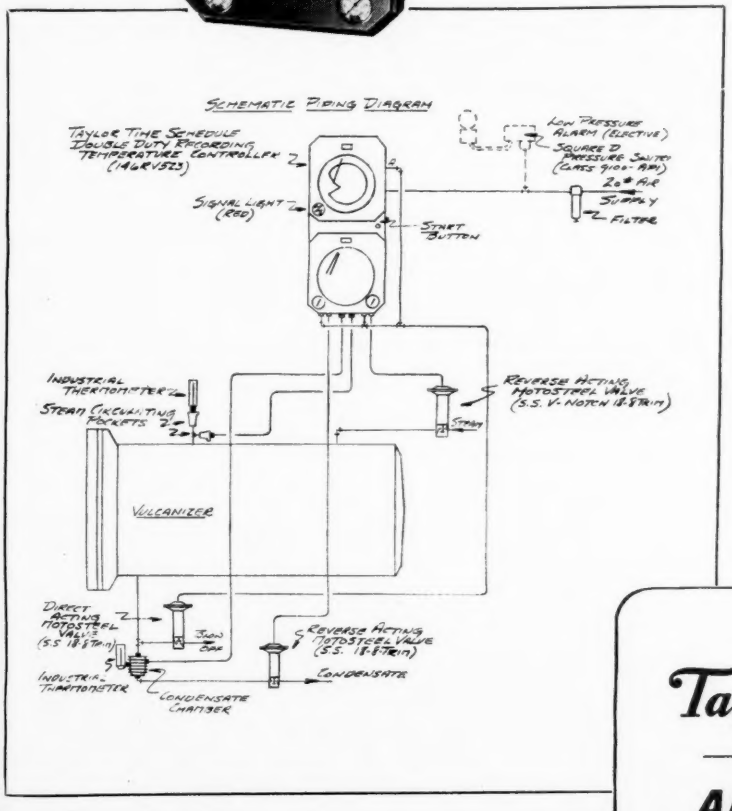
H. M. ROYAL, INC., Trenton, N. J.
ST. LAWRENCE CHEMICAL CO., LTD., Toronto - Montreal

# How to make SYNTHETIC rubber act NATURAL!



EVERYBODY knows there are more headaches in curing synthetic rubber than natural rubber—but this vulcanizer control system does away with a lot of 'em! When your curing cycle has been determined, just load the vulcanizer and push the button—the Taylor Time Schedule Controller does the rest! Here's what this particular set-up for horizontal vulcanizers gives you:

1. **Push-button starting**
2. **Controlled rate of rise to curing temperature**
3. **Curing time adjustable in 1 to 6 ratio**
4. **Discharges condensate throughout cure**
5. **Shuts off steam at end of cure**
6. **Opens blow-down valve**
7. **Cam stops at starting position for next run**




We're proud of the Taylor Time Schedule Controller because it's one of the most versatile and flexible instruments ever made. And it works equally well on vertical vulcanizers. In fact, it does *every* job with the same typical Taylor Accuracy! Call your Taylor Field Engineer for more details. Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada. *Instruments for indicating, recording, and controlling temperature, pressure, humidity, flow and liquid level.*

**BUY MORE WAR BONDS AND KEEP 'EM!**

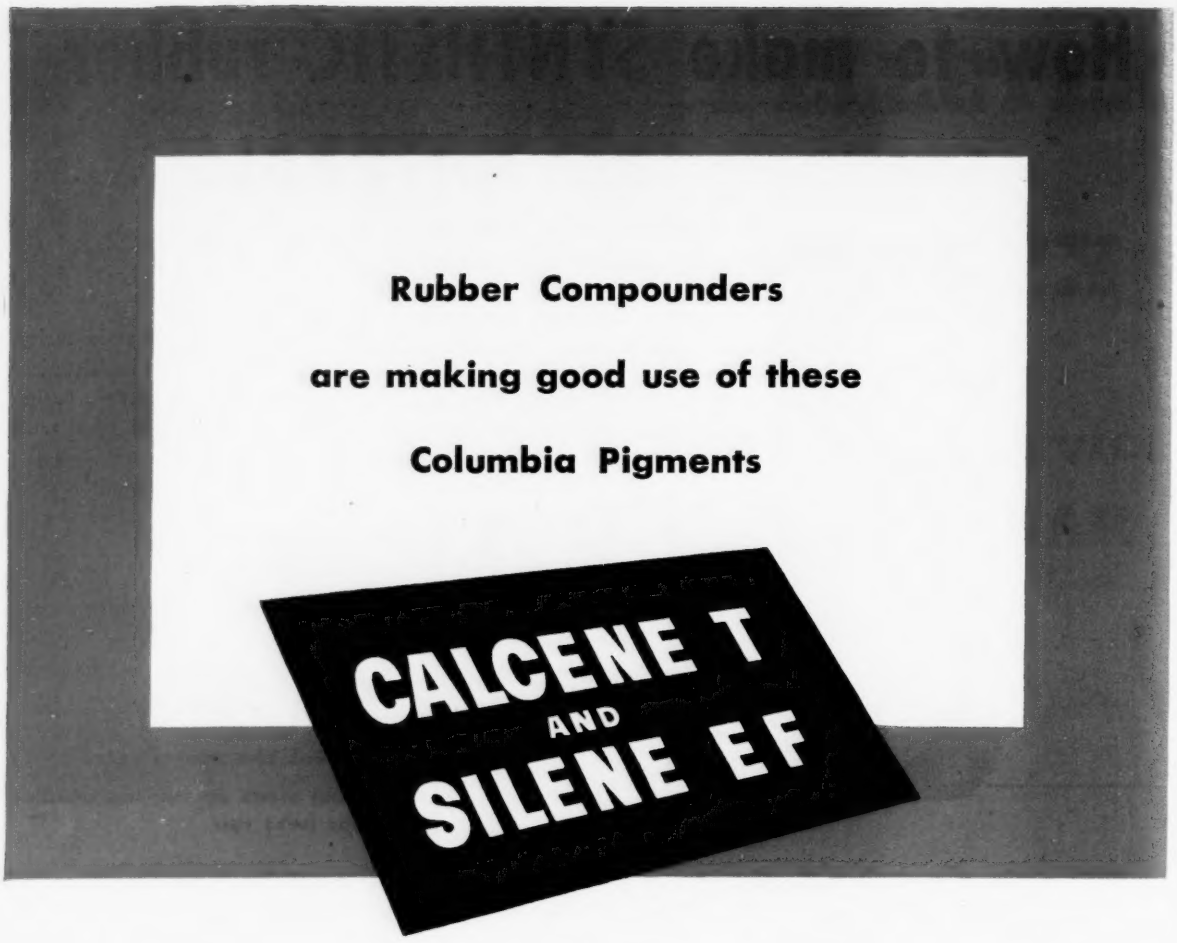
ARMY NAVY

*Taylor Instruments*

MEAN

ACCURACY FIRST

IN HOME AND INDUSTRY




Both Calcene T and Silene EF are helping Compounders to produce a wide variety of desirable properties in GR:S and other rubbers.

For example, Silene EF is being used in critical items such as inner tubes, colored abrasion goods, products requiring high tear-resistance, and many molded products. Calcene T is being used with GR:S for wire insulation and other stocks where high tensile strength is required. Calcene T and Silene EF together are enabling the manufacture of a highly satisfactory GR:S "no-mark" sole and heel stock.

**SEND FOR DATA**

Silene EF is a white, finely divided calcium silicate, conferring high modulus, hardness, tear-resistance and good tensile strength up to high loadings. The closest approach to a "white carbon black."

Calcene T is a coated precipitated calcium carbonate product of extremely fine particle size, conferring low modulus, high tensile strength, high resistance to tear and abrasion, smooth, fast extrusion and good processing properties.

Complete data will be furnished on request.

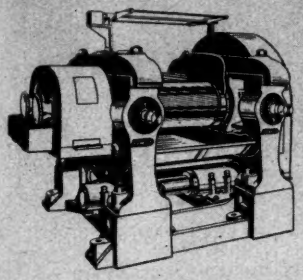
**COLUMBIA CHEMICALS**

PITTSBURGH PLATE GLASS COMPANY
COLUMBIA CHEMICAL DIVISION
GRANT BUILDING • PITTSBURGH 19, PA.

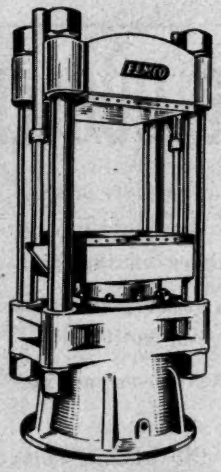
Chicago • Boston • St. Louis • Pittsburgh • New York • Cincinnati • Cleveland • Philadelphia • Minneapolis • Charlotte • Los Angeles

# HEAVY DUTY

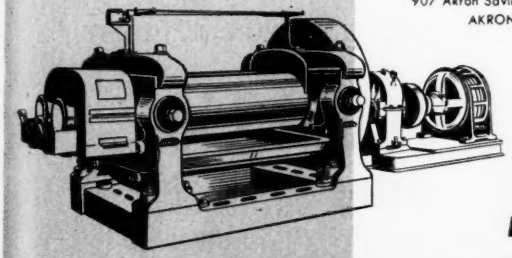
## RUBBER *and* PLASTICS PROCESSING MACHINERY



EEMCO CRACKER



EEMCO PRESS



EEMCO MILL

**Outstanding features of the line of Rubber and Plastics Processing Machinery manufactured by EEMCO are (1) correct design (2) sturdy and dependable (3) built for heavy duty and long life with minimum repair. All EEMCO Rubber and Plastics Processing Machinery is built in smaller sizes for laboratory use. Mills, Crackers, Refiners and Washers are furnished as single units or for operation "in line" of two or more. Floor level drives are provided when wanted. Write EEMCO for your Rubber or Plastics Processing Machinery needs—early deliveries are now being made. Bulletins on desired machines will be sent, on request.**

*Sales Representatives*

**OHIO**
DUGAN & CAMPBELL
907 Akron Savings & Loan Bldg.
AKRON, OHIO

**MIDWEST**
HERRON & MEYER OF CHICAGO
38 South Dearborn St.
CHICAGO 3, ILL.

**EASTERN**
H. E. STONE SUPPLY CO.
OAKLYN, N. J.

**EEMCO**

**ERIE ENGINE & MFG. CO.**
**953 EAST 12th ST., ERIE, PENNA.**

HAVE YOU ENTERED THE CHICAGO RUBBER GROUP CONTEST?

# MAGNESIA

## MAGNESIUM CARBONATE

*Technical and U.S.P. Grades*

## MAGNESIUM OXIDE

**EXTRA LIGHT** The Original Neoprene Type
A supreme quality product for the rubber trade. Extremely fine state of division. Improves storage stability and resistance to scorching. A curing agent unexcelled for increased modulus, greater resilience, reduced heat build-up, lower compression set and retention of tensile strength during heat service.

**LIGHT** A high quality product of greater density than "Extra Light," but high in MgO and low in impurities. An excellent value for many uses.

**MEDIUM** A good value. Very active. High Magnesia content, low in impurities. Medium density.

**HEAVY** All types can be furnished. Specially ground to meet the exacting Code Pigment Specifications of the Rubber Trade. Unground types for chemical uses.

**PACKAGES**—Specially designed to protect contents from moisture and air. Corrugated carton with special water-proof liner, and inner paper liner. Five-ply multi-wall bag, including asphalt liner.

*Special Service for All Requirements of the Rubber Trade*

## GENERAL MAGNESITE & MAGNESIA COMPANY

*Specialist in Magnesia*

MANUFACTURERS—IMPORTERS—DISTRIBUTORS

**2960 East Venango St.** **PHILADELPHIA 34, PA.**

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BOSTON (Cambridge)—William D. Egleston Co.
BROOKLYN — Smith Chemical & Color Co.
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CHICAGO—The C. P. Hall Co.
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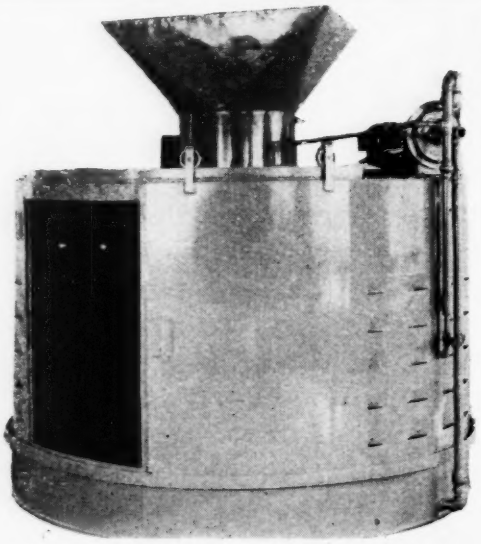


# RUBBER SLAB COOLER

**The mill room equipment at the left is used to lubricate cool and dry rubber slabs having been hand cut from a rubber mixing mill.**

**Do that job for less money, in less floor space with cleanliness around your mills.**

**Simple to operate, practically no maintenance or care required.**

**Set in required location. No anchor bolts necessary. Connect electrical line, water and drain. It is then ready for operation.**

FURTHER DETAILS UPON REQUEST

## The Akron Standard Mold Co.

Akron — "The Established Measure of Value" — Ohio

# It's REPLACEABLE Joe!

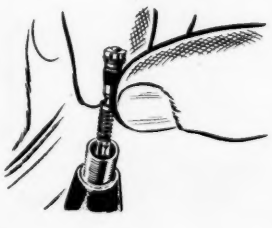
*The valve can be fixed in a few seconds. That's good news to men responsible for "keeping 'em rolling and fighting"*

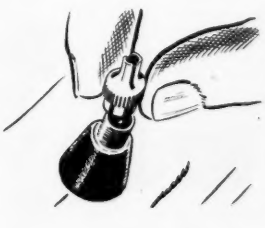
Suppose G.I. Joe's valve was the Schrader Valve of 50 odd years ago *without* today's removable, replaceable parts! He would have to dismount his tire and tube and vulcanize an entire *new valve* on his tube to repair it!

Compare this with the modern Tire Valve Equipment. In the event of any possible damage of tire valve sealing parts, he can make a complete change of cap and core in less than a minute. Think of what that means to the mobility of our troop movements which today counts on split second timing! One standard size of cap and core is interchangeable in the standard valve in any pneumatic tire on any vehicle—the smallest, lightest, quickest type of service stock—an advantage which supply experts, in and out of the Armed Forces in all parts of the world, appreciate.

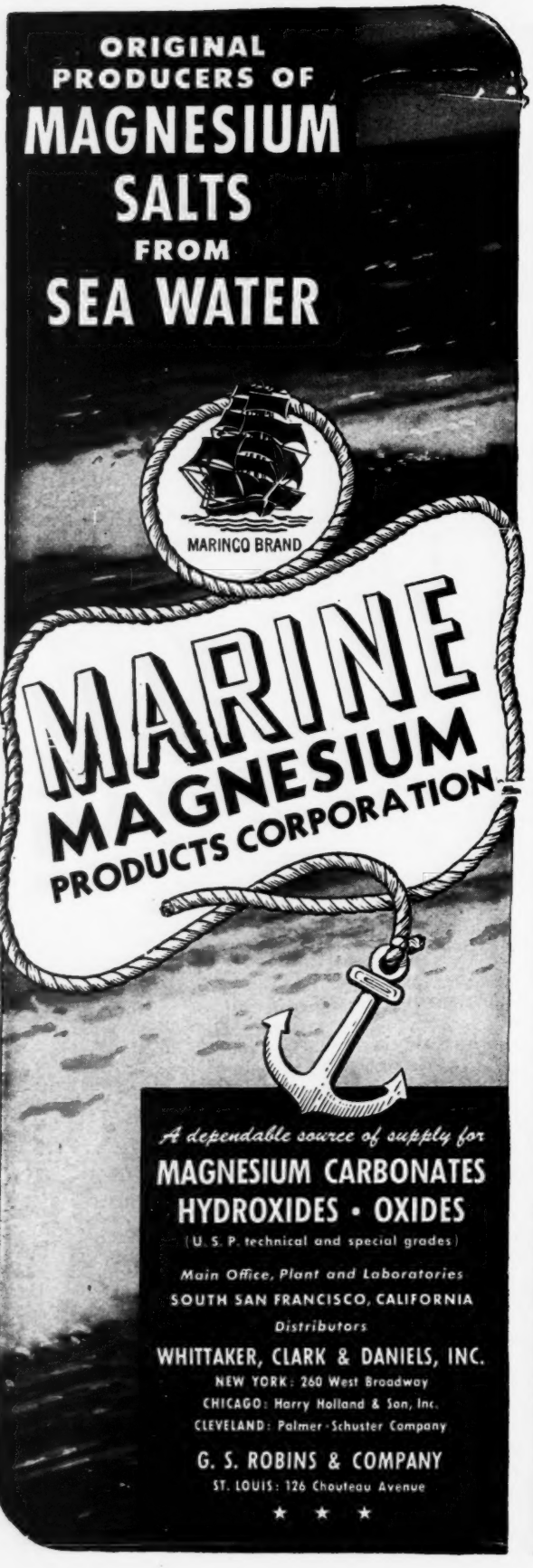
As time goes on, the parts of any valve wear. Abuse, grit and age cause any valve to lose its 100% efficiency. The experience of many years, plus billion after billion of miles—week after week, of actual performance on trucks, cars, cycles, have proved this to be true. But due to foresight of the tire, automotive and valve industries, the tire valve can be restored to its original efficiency by merely inserting a new core and applying the standard cap. The Schrader Valve Cap is guaranteed airtight up to 250 lbs. pressure.

*A copy of "How to Prevent Roadside Flat Tires," an explanation of the Comparative Air Loss System, as described in the Office of Defense Transportation Bulletin, is available from Schrader upon request.*





**A. SCHRADER'S SON,** ***Division of Scovill Manufacturing Company, Incorporated,*** **BROOKLYN 17, NEW YORK**



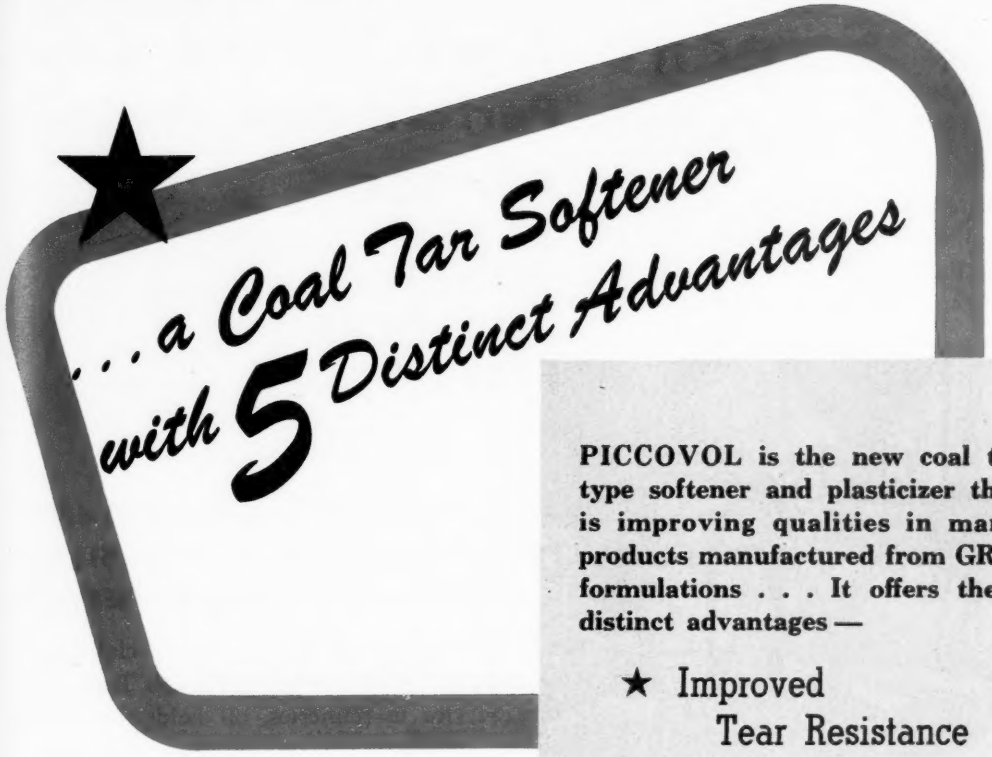

# VULCANIZED VEGETABLE OILS

## —RUBBER SUBSTITUTES—

Types, grades and blends for every purpose, wherever Vulcanized Vegetable Oils can be used in production of Rubber Goods—be they Synthetic, Natural, or Reclaimed.

*A LONG ESTABLISHED AND PROVEN PRODUCT*

THE CARTER BELL MFG. CO.
SINCE
CARTER BELL PRODUCTS
1903
SPRINGFIELD, NEW JERSEY




**PICCOVOL is the new coal tar type softener and plasticizer that is improving qualities in many products manufactured from GR-S formulations . . . It offers these distinct advantages —**

- ★ Improved Tear Resistance
- ★ Higher Tensile Strength
- ★ Improved Elongation
- ★ Better Aging Properties
- ★ Unlimited Availability

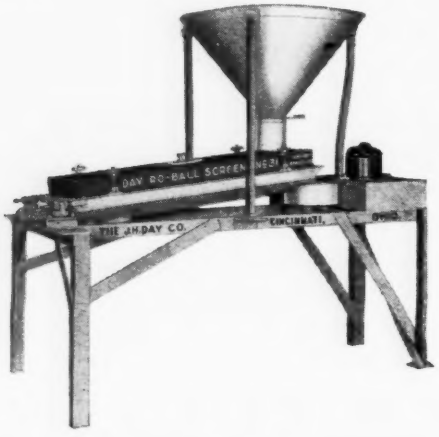
★ **PICCOVOL**

*Manufactured by Pennsylvania Industrial Chemical Corp. to meet Rubber Reserve Company specifications.*

STANDARD Chemical Company
General Offices. AKRON 8, OHIO

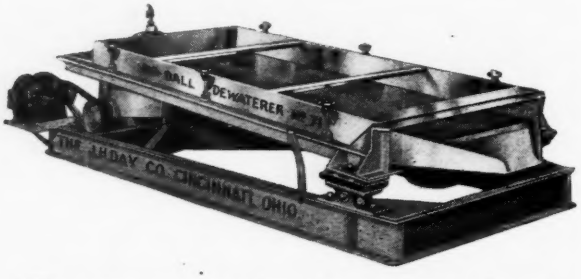
# Ro-Ball Screens for the Rubber Industry

The action of the screen box, which operates at a nearly level angle, combines with the Day Super-Active Ball Cleaning Device to produce an effective screening action.




The Ro-Ball above is a No. 31, Hopper Feed, Closed Top Type which is used extensively for processing of natural or compounded rubber products, where sulphur, oxides, etc., are used, and dust tight construction is required.

These machines can be furnished in either single or multiple screen construction and in various sizes to meet all requirements.

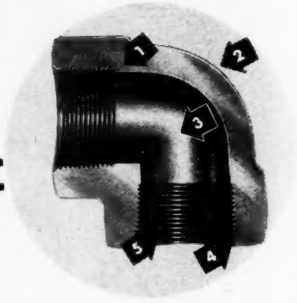



The open construction shown above is used extensively for dewatering operations where caustics are used in reclaiming rubber. These units can be furnished in various sizes to meet all production requirements.

**The J.H.DAY Company**
**CINCINNATI 22 OHIO.**

# Time Tested and Performance Proved

## FORGED STEEL SCREW END PIPE FITTINGS




***AVAILABLE IN 2000—3000 AND 6000 POUND CLASSES FOR OIL—GAS—STEAM —AMMONIA AND HYDRAULIC SERVICE***

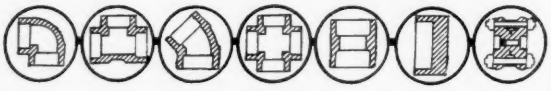
• W-S Forged Steel Fittings are especially recommended for High Pressure, High Temperature Service in refineries, oil fields, chemical plants, shipyards, air conditioning and refrigeration plants, power plants and all hydraulic services.

**WHY W-S FITTINGS ARE PREFERRED**

1. Long low bands extending beyond thread provide strength where necessary to insure tight joints as well as ample wrench surface for easy installation.
2. A high safety factor is insured through heavy walls of uniform thickness.
3. Unrestricted flow is provided by passages greater in area than the pipe of equivalent size.
4. All Fittings are chamfered to protect the thread and afford easy entrance of the pipe.
5. Threads are long, accurately cut—perfectly aligned insuring tight joints.

**W-S Forged Steel Screw End Fittings are machined from solid drop forgings. Available in three classes—2000—3000 and 6000 pound. Sizes ¼" to 4" I. P. S. Each class can be furnished in Carbon Steel; Carbon-Molybdenum Steel; Chromium-Molybdenum, Steel or Stainless Steel. Ask for Bulletin A-3. The Watson-Stillman Co., Roselle, N.J.**

*Sold Through Leading Distributors*



**WATSON-STILLMAN**

**DESIGNERS AND MANUFACTURERS OF FORGED STEEL FITTINGS, VALVES AND HYDRAULIC EQUIPMENT**

6336

# Choose your opening where you want it!

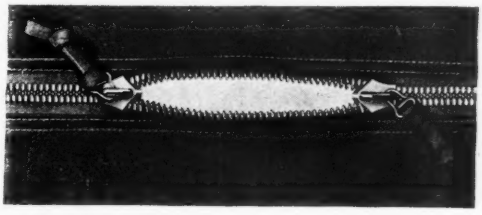
**New "double-acting" Crown Zipper permits two or more sliders on one track—opens at given point—spells new convenience in postwar rubber applications!**

In the thick of the mud, blood, sweat and strain of today's fighting, hundreds of military items equipped with Crown Zippers are proving zippers can be big and tough yet amazingly easy to operate, small and dainty yet virtually indestructible!

One of the most sensational Crown developments is a zipper that permits two or more sliders on one track—opens instantly at any given point. (One recent Crown application actually has *ten* sliders!)

This amazing Crown Zipper feature, coupled with four other basic superiorities over old-style, conventional zippers (see list below), will result in new convenience, easier operation, in postwar rubber goods. Heavy boots, raincoats and boat covers are but a few of the many items Crown Zippers will fasten better.

When *you* turn to postwar products, Crown engineers, fresh from their experience in designing hundreds of military items, will work with your designers to adapt—or, if necessary, *create*—special zipper applications to meet your own manufacturing problems.



**CROWN ZIPPERS are 5 ways better**

**1.** Takes sharp curves

**2.** Die-cast for smoother action—extra strength

**3.** Provides opening wherever you want it

**4.** Won't lock open

**5.** Resists corrosion

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## MEANS TOP PERFORMANCE

In these times of extreme demands upon the capacities of the nation's rubber industry, dependability in chemical supplies is more essential than ever. Cyanamid's "controlled quality" standards *PLUS* the strategic locations of Cyanamid "stock points" assures a dependable, convenient and well-rounded service to the rubber industry that is helping to maintain fast, economical processing schedules for the war effort and essential civilian uses.

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AERO BRAND DPG
AERO* BRAND ACRYLONITRILE
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K & M MAGNESIUM OXIDE
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*"When performance counts... call on Cyanamid"*

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UNITED manufactures every type of roll used in the production and processing of natural or synthetic rubber. The superiority of UNITED ROLLS has been demonstrated for more than 30 years in plants of the principal rubber manufacturers of the world.

Comprehensive technological experience, advanced engineering skill, modern production facilities, and UNITED'S internationally recognized leadership in the design and construction of rolls are your guarantee of complete satisfaction.

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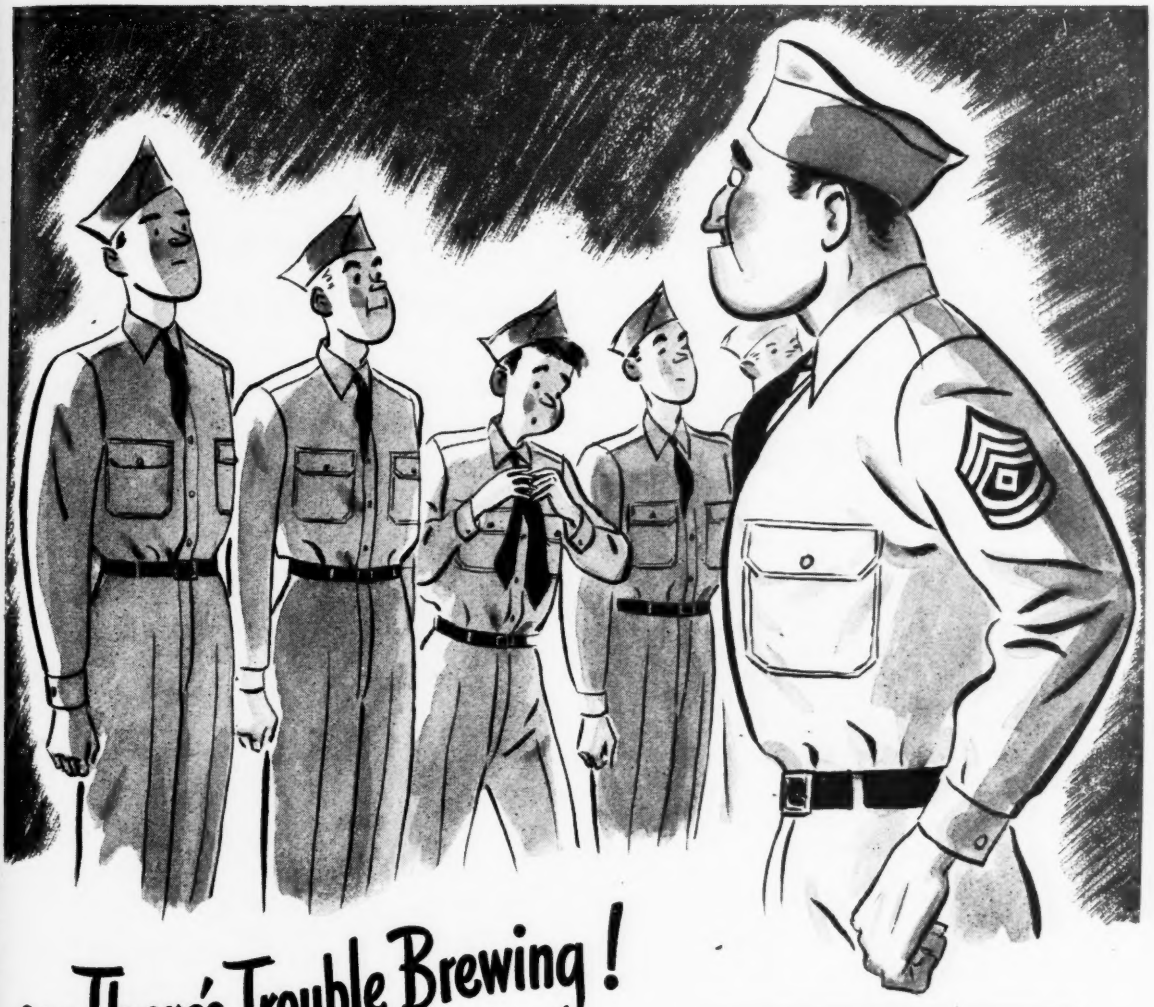

# ...There's Trouble Brewing!

Yes—and there's trouble brewing in YOUR plant when shipments of the solvent you are using for a certain job vary in uniformity. You've got to have UNIFORMITY in solvents to keep production at its peak and protect the quality of *your* product.

Specify SKELLYSOLVE and you'll *get* uniformity. That means a given type of SKELLYSOLVE ordered today will be absolutely *duplicated* in the same type of solvent ordered next week or months hence. You can depend on SKELLYSOLVE—because we depend on *scientific, instrumented quality control* in the manufacturing process.

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*in the*
**RUBBER INDUSTRY**

There are six different types of Skellysolve which are especially adapted to various uses in the rubber industry, for making rubber cements, and for many different rubber fabricating operations. Skellysolve offers many advantages over benzol, rubber solvent gasoline, tuluol, carbon tetrachloride, etc. It will pay you to investigate Skellysolve. Write today.

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SOLVENTS DIVISION, SKELLY OIL CO.
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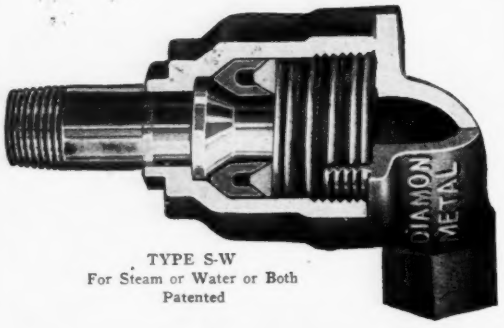
*Correct Principle . . .*
*Quality Materials . . .*
*Honest Workmanship*




TYPE S-W
For Steam or Water or Both
Patented

TRADE MARK
DIAMOND
SWING JOINT

Years of satisfactory service on thousands of installations have proved the DIAMOND swing joint design.

Its principle is fundamentally correct.

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DIAMONDS do not — cannot leak — even in continuous 24 hour service on alternating steam and cold water. They put a definite end to frequent repacking and costly shut-downs.

Put them on, — then forget them.

A Chicago rubber firm writes: "We have found your joints to be most satisfactory. We like them more than any connection that have been used by us." (name on request.)

*Write today for catalog and prices*

Sizes ⅜", ½", ¾", 1" and 1¼".
Shipped from stock. No waiting.

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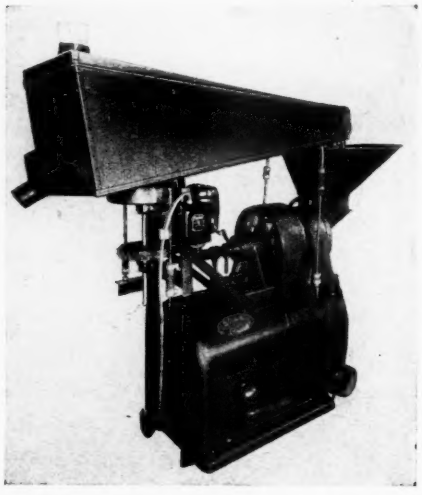
# SPAN
## GRINDING MILL
### For Producing
### GROUND RUBBER SCRAP

**Ground Rubber Scrap is being used to advantage in Molded Goods of all types.**



**SPAN GRINDING MILL (Type VIII), illustrated above, reduces all grades of vulcanized rubber scrap to fine powder form ready to be mixed with ordinary molding compounds.**

**Provided with an attached vibrating screen, it is a compact, self-contained unit producing a uniform material automatically and at low cost. Capacity 200 to 400 lbs. per hour. Power required, 25 H. P.**

**Type X (not illustrated), for larger production.**

***Send for Full Information***

**M. PANCORBO**
**155 JOHN STREET NEW YORK 7, N. Y.**

**Technical Bulletin No. 6** — on the Compounding of GR-S with Substantial Loadings of Zinc Oxide

# A "Santocure" Accelerated Compound

THE USE of "Santocure" as the accelerator in GR-S compounds reinforced with 16 volumes of Zinc Oxide develops flat-curing compounds of moderate tensile strength and high elongation, and with modulus values holding practically constant over a range of cures. This compound is excellent from the standpoint of resilience and heat generation, but is somewhat deficient in cut-growth resistance.

| COMPOUND NO. 6 | |
|---|---|
| GR-S | 100.0 |
| Sulfur | 3.0 |
| "Santocure" | 1.5 |
| E.L.C. Magnesia | 5.0 |
| Cumar MH 2½ | 7.5 |
| Zinc Oxide | 100.0 |

## ORIGINAL RESULTS

| Time of Cure Min. at 45 Lb. | Tensile Strength Lb./Sq. In. | Per Cent Elongation | Load (Lb./Sq. In.) For Elongation of | | | Permanent Set |
|---|---|---|---|---|---|---|
| | | | 200% | 300% | 400% | |
| 7.5 | 1220 | 585 | 165 | 245 | 405 | .20 |
| 15 | 1120 | 515 | 250 | 375 | 540 | .17 |
| 30 | 1040 | 490 | 250 | 330 | 540 | .15 |
| 45 | 1090 | 500 | 250 | 335 | 545 | .17 |
| 60 | 935 | 480 | 245 | 325 | 530 | .13 |
| 90 | 1050 | 500 | 260 | 350 | 525 | .13 |

| Time of Cure Min. at 45 Lb. | Shore Hardness | Goodyear-Healey Pendulum | | Compression Fatigue (Goodrich Flexometer)* | | | | | Cut-Growth Resistance Inches Failure at |
|---|---|---|---|---|---|---|---|---|---|
| | | Indentation in mm. | Per Cent Rebound | Per Cent Initial Comp. | Running Time and Per Cent Permanent Set | Max. Temp. Rise °C. | Dynamic Compression | | |
| | | | | | | | Initial | Final | 13,000 Cyc. |
| 45 | 49 | 8.21 | 64.7 | 22.6 | 15′— 2.6 | 12.3 | 13.9 | 16.0 | .50 |
| 60 | 50 | 8.28 | 65.1 | 22.1 | 15′— 2.8 | 12.0 | 13.5 | 15.4 | |

*Test Conditions: 100 Lb. Load. 0.15″ Stroke. 100°C. Oven Temp.

Since the sulfur-accelerator ratio plays such an important part in obtaining optimum properties in high zinc oxide compounds, further studies are in progress with this accelerator, including the addition of secondary accelerators, which will be reported later.

New Jersey zinc

THE NEW JERSEY ZINC COMPANY
160 FRONT STREET • NEW YORK 7, N. Y.
Products Distributed by THE NEW JERSEY ZINC SALES COMPANY
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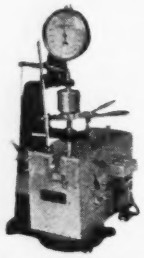
DEVELOPED FOR THE MEASUREMENT OF THE PLASTICITIES OF RUBBER COMPOUNDS. IT IS SIMPLE, RAPID, ACCURATE, INDISPENSABLE FOR CONTROLLING CRUDE AND COMPOUNDED RUBBER, FOR STUDYING THE PLASTIC PROPERTIES AND SCORCHING RATES OF UNVULCANIZED COMPOUNDS.



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A precision instrument for the control and study of plastic materials.

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Sample piece cutter for Goodrich Improved Plastometer.

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## SODIUM OLEATE
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BARBER ASPHALT CORPORATION
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The term
## "COTTON FLOCKS"
does not mean cotton fiber alone

**EXPERIENCE**
over twenty years catering to rubber manufacturers

**CAPACITY**
for large production and quick delivery

**CONFIDENCE**
of the entire rubber industry

**KNOWLEDGE**
of the industry's needs

**QUALITY**
acknowledged superior by all users are important and valuable considerations to the consumer.

*Write to the country's leading makers for samples and prices.*

## CLAREMONT WASTE MFG. CO.
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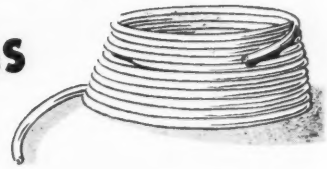
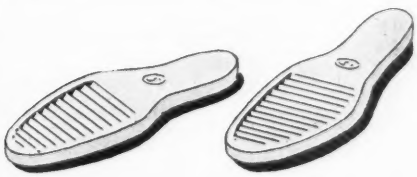
*The Country's Leading Makers*

# THE *Whitening* EFFECT OF TITANOX Is Visible In Many Places



Admittedly, GR-S is much harder to make white and bright than is natural rubber. This is the problem to which TITANOX rubber research is devoting its major efforts, conscious of its obligation to the Rubber Industry.

Much progress has been made as evidenced by the whitening effect of TITANOX pigments in so many articles for war and civilian use. In GR-S, as in natural rubber, TITANOX pigments give the highest whiteness obtainable.



TITANOX

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**TITANIUM PIGMENT CORPORATION**
SOLE SALES AGENT
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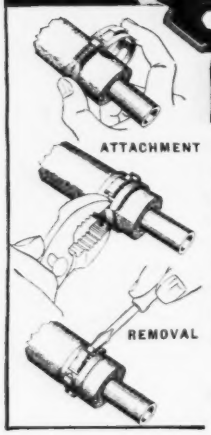
THE *New*

*Tinnerman*

**HOSE CLAMP**




● This new one piece hose clamp can be installed and removed *easier* and *faster* because of its simple but sturdy ratchet-type locking mechanism. It weighs less, has a lower profile, exerts uniform pressure and may be used over and over again. Approved by Army Air Forces and Navy Bureau of Aeronautics. Sizes from ½" O.D. up.

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AND MOLDS FOR RUBBER SPECIALTIES AND MECHANICAL GOODS

machined in a large modern shop at low prices by specialists in the field. We also build special machinery to your drawings.

*Submit inquiries for low quotations.*

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**AKRON - OHIO**

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*Synthetic Resins*

Use With Synthetic Rubbers To:

- ★ **IMPROVE PROCESSING**
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- ★ **IMPROVE TEAR AND ABRASION**
- ★ **IMPROVE SHRINKAGE**
- ★ **IMPROVE TUBING OF "PURE GUM"**

THESE RESINS HAVE EXCEPTIONALLY GOOD ELECTRICAL AND WATER ABSORPTION PROPERTIES

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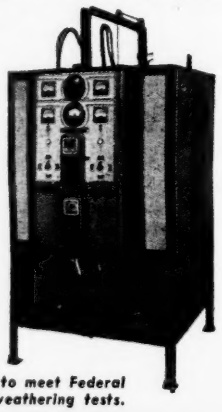
**WEATHERING TEST for rubber products**

**Weathering effects of sunlight, rain, heavy dew and thermal shock reproduced in the laboratory at an accelerated rate that reduces years of actual weathering to a few days of testing in the —**

**ATLAS TWIN-ARC WEATHER-OMETER**

The Twin-Arc Weather-Ometer has full automatic control of light and water periods. The Atlas Cycle Timer unit can be set to reproduce any combination of weathering conditions. A direct reading thermal regulator, automatic shut-off switch and a running time meter is included on the control panel. After setting exposure cycle on the control panel the Weather-Ometer is safe to be left in continuous operation over night without attention except to replace carbons once in 24 hours.

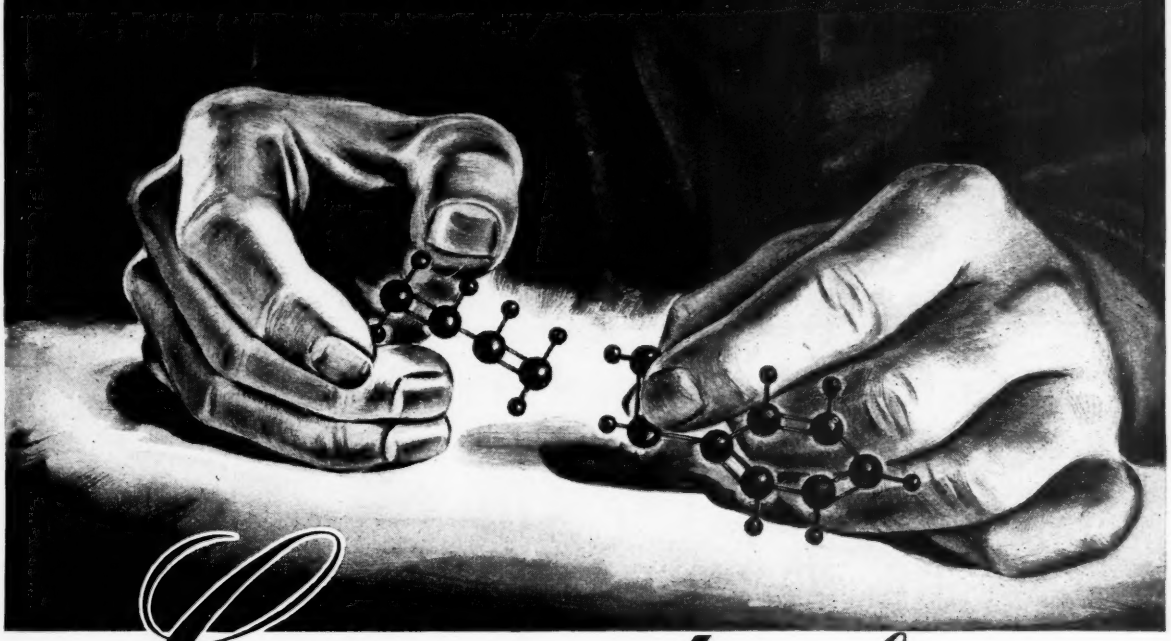


***The Atlas Weather-Ometer is required to meet Federal Specifications demanding accelerated weathering tests.***

**ATLAS ELECTRIC DEVICES COMPANY**
361 W. Superior Street, Chicago 10, Illinois

*Originators and sole manufacturers for over a quarter of a century. . . Weather-Ometers, Launder-Ometers, Fade-Ometers are the accepted standard accelerated testing machines all over the world.*

# SYNTHETIC RUBBER & RESIN COMPOUNDS



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Protective Clothing
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**A practical approach to the use of synthetic dispersions in your product is to refer your problem to our laboratory. No matter what the process—coating, impregnating, or bonding—our experienced technical staff can compound the material best suited to your requirements. In the case of an entirely new product, we will work out all the details of manufacturing procedure—from pilot operations to commercial production in your plant. Why not talk it over with one of our technical representatives?**

**GRS latex types 2 and 3, normal and concentrated, available from stock.**

*A Complete Service to Manufacturers*

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Agents for Rubber Reserve Company for storage and distribution of natural rubber latex. Distributors for Rubber Reserve Company for synthetic latex. Operators of the Government-owned Baytown, Texas, synthetic rubber plant in collaboration with the General Tire & Rubber Co.

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The ADAMSON MACHINE Co.

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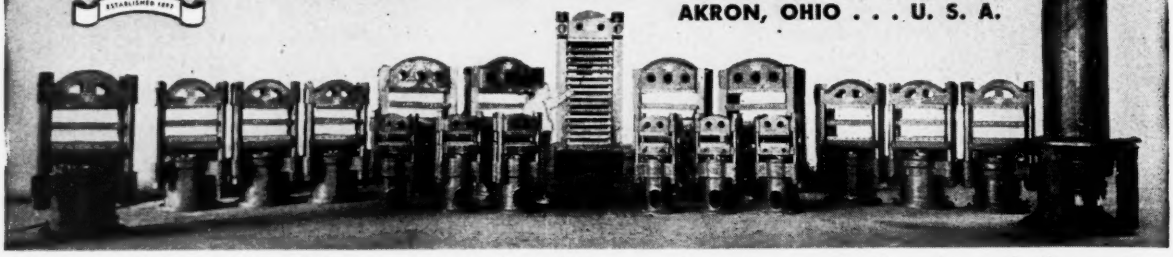

Adamson mixing and molding equipment is built to meet modern production demands for greater accuracy at lower costs. What's your machine problem? A card will bring full particulars. Write today!

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For Use with Neoprene

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Makers of Stamford "Factice" Vulcanized Oil

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64 YEARS WITHOUT REORGANIZATION

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for every purpose
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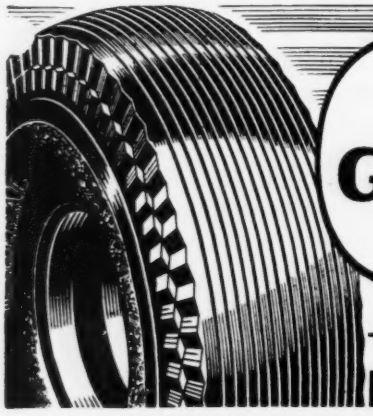

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Factory Control KRAFT SYSTEM TIRE RENEWING

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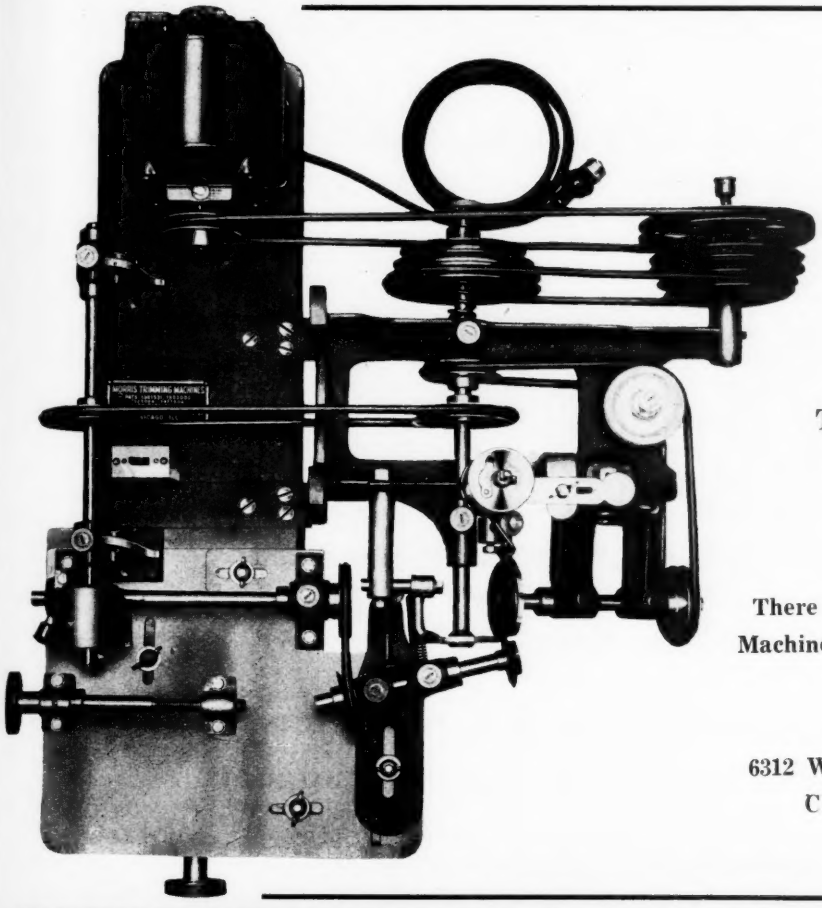

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**TRIMMING**

**MACHINES**

**ARE**

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**Trims inside and outside**

**SIMULTANEOUSLY**

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**There is a MORRIS Trimming Machine for Every Trimming Job**

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Volume 111 Number 4

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INDIA
# RUBBER WORLD
NATURAL & SYNTHETIC

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RUBBER WORLD
NATURAL & SYNTHETIC
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# Peace, Progress, and Taxes[1]

**H. E. Humphreys, Jr.**[2]

H. E. Humphreys, Jr.

**THE problem of determining the proper tax policy for the immediate postwar years in view of a probable national debt of 300 billion dollars at the end of the war and the relation of this policy to industry and jobs were discussed by H. E. Humphreys, Jr., of the United States Rubber Co., before the recent meeting of the National Association of Manufacturers in New York. The talk contains so many important facts regarding the critical need of paring expenditures to the hardpan of essential, inescapable items in order that the balanced budget can become an object of national policy; not a coincidence, as Mr. Humphreys puts it, that this paper is presented here as a suggestion for serious study at the beginning of this New Year. The fact that the contents of this talk represent a composite picture of industrial opinion obtained through polls and tax forums covering one end of the country to the other on behalf of the NAM taxation committee is an additional recommendation for paying a great deal of attention to the findings reported and the tax program proposed. EDITOR.**

THE subject of taxation is simply bound to come up wherever people are assembled in groups of two or more. As a subject of conversation, it beats the weather — and future weather and taxes both can be forecast with about the same degree of absolute uncertainty.

I fortified myself as best I could to discuss such a controversial subject. I wouldn't be doing it at all had I not surveyed the field in advance. Through polls and tax forums covering one end of the country to the other —on behalf of the NAM taxation committee I have been putting together a composite picture of industrial opinion. So what I present is mostly a reflection of yourselves.

### Spending Makes Taxing

The only logical approach to the problems of taxation is on the basis of spending. We can have no complaints about the tax bill if we accept the services rendered. It is futile to consider taxation apart from spending. They are as inseparable as production and sales. One cannot long exist without the other.

Yet our Congress has one group of committees to plan the spending and a separate group of committees to plan the raising of revenues. In earlier times a unified approach to the budget was the function of one committee. This wise procedure was abandoned—and so were balanced budgets. Congressional reorganization again should unite the spending and taxing committees. The balanced budget should be an object of national policy; not a coincidence.

### The National Debt

Perhaps the greatest reason for putting our financial house in order and reappraising our spending powers is the national debt. The debt is built upon war bonds —upon dimes from piggy banks; dollars from hard-handed workmen; savings for old age, and many a thousand laid up by GI Joes for their dreams of peace.

Repudiation, in whole or in part, or by cynical financial operation would be completely immoral. Every bond must be redeemed by hard dollars.

[1] Presented at the forty-ninth annual meeting of the National Association of Manufacturers, Waldorf-Astoria Hotel, New York, N. Y., December 7, 1944.

[2] Vice president and chairman, finance committee, United States Rubber Co., 1230 Sixth Ave., New York, and chairman of the NAM committee on taxation.

It is said this debt will amount to 300 billion dollars at the end of the war. The plain truth is that we will be close to the very limit of our borrowing power, requiring the end of deficit spending, a course of rigid economy, and the balancing of the budget. Three hundred billion dollars is nearly twice the assessed valuation of all taxed property in the nation; is roughly equivalent to all its accumulated wealth—all its gold and silver, stocks of goods, urban and farm lands, residences, factories, warehouses, public buildings, trucks, buses, ships, railroads, and highways. A three hundred billion dollar national debt means a per capita obligation of $2,222—or, in terms of the 50 million people who pay taxes, it would be equal to $6,000 per taxpayer.

Business leaders almost unanimously favor a balanced budget after the war, and they approve of debt retirement just as strongly. Ninety-nine per cent. favor a peacetime plan of debt retirement. Many believe that the debt should be reduced at the rate of 1% annually. This cost would be three billion dollars, which with interest payments of six billion dollars, would require nine billion dollars annually for debt. If nine billion dollars is set aside annually, the debt can be retired in less than 60 years. I believe this is a goal worth shooting for.

Some earnest students of government say that the minimum postwar budget, including debt payment, can be between 17 and 22 billion dollars. Add 10 billion dollars for state and local spending, and you have a total expenditure of 27 to 32 billions. That is called a minimum budget, but it is about four times any federal budget of peacetime and would mean a greater proportion of income diverted for taxes than the United States is accustomed to. To exceed that budget greatly invites disaster, either by strangling industry with taxes or piling up debt, or both.

We are only 135 million people in a world of two billion people. We cannot aid the world if we bankrupt ourselves trying to remake it. We must not transfuse our strength until we are paralyzed. Painful effects must follow if we persist in seeking federal favors which prolong deficit financing. Subsidies and mounting debt are short cuts to socialism. Now or never, as individuals, as businessmen, as cities, as states, and as a nation, we must learn that Uncle Sam has exactly as many dollars to spend as he can get by reasonable taxes.

In pointing our budget toward peace, let us in industry first make certain that the amount of government we ask for is essential. We cannot request government extravagances for ourselves if we are to impress upon the public and our lawmakers the critical need of paring expenditures to the hardpan of essential, inescapable items.

### Industry and Jobs

Within recent weeks I have discussed taxes with almost 500 business leaders from practically all the industrial states. Additional hundreds have replied to questions on a number of fundamental tax matters. What they say, I believe, accurately reflects the sentiment of the entire business community.

First, I am proud to report that men of industry willingly bear their tax burdens as patriotic citizens. They do not look forward to easy taxes; they realize heavy taxes must be paid for years to come.

Federal taxes now flow into the U. S. Treasury at the rate of 45 billion dollars a year. Another 10 billion is being collected by state and local governments. The great bulk of this 55 billion-dollar total comes from levies on useful properties, on the flow of goods and services, and on business earnings. Business corporations now pay an estimated 19 billion dollars in direct taxes to federal, state, and local governments.

Corporations also are our biggest job makers. Of the 54 million men and women now at work, corporations give employment to about 30 million. And again I am proud to report that in considering the tax needs for the future, industry's first concern is for jobs. Private industry pays out more than 80 billion dollars in wages and salaries, an amount more than half of our national income. This kind of payroll depends upon a tax atmosphere that will encourage the American plan of progress by improving the product, the service, and the standard of living.

If taxes weigh too heavily upon business, profits cease, and new capital is not produced; new jobs are not created and the whole economic system dries up.

American business is no automatic device which dispenses jobs and dividends year in and year out. It is made up of people at work. It is human; it eats food, lives in apartments, houses, and flats; it has wives and babies. Its lifeblood is labor, which produces and nourishes the framework, which is capital. It can prosper only in a healthy atmosphere, friendly to opportunities offered citizens who are willing to risk their savings with something better than an even chance for success.

### The Transition Phase

We are all looking forward to that great day when the German is again subdued. At that moment on the home front, war production will be cut back materially. This will mean that thousands of companies must turn to civilian business, if millions of men and women are to have jobs. Here is our first challenge to maintain the present level of employment and production in the future, a challenge as inevitable as the defeat of Germany.

Business leadership almost unanimously believe that the 95% rate on excess profits should be reduced after Hitler Germany falls. This opinion comes from the same leaders who, as members of NAM, were the first in America to advocate a 90% excess profits rate to supply needed revenues when the war machine was expanding. Early in the war, you will remember, the excess profits rate was scaled up to 60%. As we approach total victory, and the budget is substantially reduced, industry feels that we can reverse our war tax curve.

There is no sharply focused opinion on what adjustment in the excess profits rate should be made in the transition period. In our poll 92% of the industrial leaders suggested rates ranging from 50 to 70%. Seventy-five per cent. of the business men polled believe that the combined normal and surtax of 40% on corporations should be reduced at the end of the German war to stimulate production and jobs in the transition phase. The composite average of all the rates suggested—and there was a wide variation—indicates about a 30% normal and surtax rate should be enacted.

While these figures are not conclusive, this much is clear: the job creators of the nation assert that some degree of tax reduction will be a definite and direct factor in maintaining employment after a sharp curtailment in war expenditures.

### Progress and Peace

America's economic objective must be more goods for more people at less cost. That's our definition of progress, as American as a buffalo nickel.

Tax policy-makers must be as eager to promote a constructive peace as they were to finance a destructive

war. A high volume of national income is the way to balance our budget and avoid debt repudiation. With high taxes and low income, we shall really see the apple-seller and leaf-raker again; while the threat of collectivism lurks in deserted factories.

We have many well-wishers in the courageous tasks ahead. But we have many pessimists, who proclaim that we cannot maintain continued prosperity in peacetime years. These doubting Thomases don't know America. They don't know how many automobiles, radios, refrigerators, tires, television sets, nylon hose, and safety pins we are ready to buy, and how, under free enterprise, there can always be newer and better things to produce.

Our tax policy should encourage the full employment of our nation's resources and skills. Industry realizes that it must carry a heavy postwar tax load. Yet industry must fight to keep postwar tax burdens below the point of discouragement. Industry must fight for a sound tax policy because of its grave responsibilities to 30 million job holders and 18 million investors.

What is the highest income tax rate corporations can pay in peacetime without discouraging the incentive for greater production and employment? Industry's answer indicates that most businessmen favor a 25% maximum peacetime tax on corporation income.

From talks around the country and the poll of executive opinion I believe that industry might willingly accept a starting peacetime rate of about 30%, reserving only the right to ask revision if this proves by actual experience to be too high.

### A Peacetime Budget

Realistic students of government spending feel that a peacetime budget of 20 billion dollars or less could supply us with very adequate federal government. If we assume that encouraging tax policies will make it possible to maintain our present level of national income in postwar years, here is the way in which we could balance a 20 billion-dollar budget:

| | |
|---|---|
| 1. From historic excise taxes, estate and gift taxes, customs, and miscellaneous levies | 5 billion |
| 2. From corporations earnings at a 25 to 30% rate | 6 to 7 billion |
| 3. From 50,000,000 individual taxpayers—the balance | 8 to 9 billion |
| TOTAL | 19 to 21 billion |

This program to raise eight to nine billion dollars from individual taxpayers compares to 20 billion dollars now being collected. This means there could be a 50% reduction in individual rates. But it demonstrates the need of a continued high level of national income and employment in order soundly to finance the kind of government to which we have grown accustomed.

Business earnings dry up quickly under adverse conditions. If during the 1932 recession we had had a 100% tax on corporate income, this would have yielded only two billion dollars. To make taxpaying comparatively productive, we must have national prosperity.

Furthermore industry looks forward to tax simplicity. Tax laws should be written so that the taxpayer can understand them, not in the ponderous complexities that bewilder even the tax experts.

We should stop that annual guessing game and repeal the capital stock tax and declared value excess profits tax—and we should eliminate the penalty tax on consolidated returns and the double taxation of dividends.

### Industry's Tax Program

Industry is setting its sights on newer, higher levels of production, employment, and national income. It believes it can achieve this goal within the framework of a tax program which includes:

1. Continuance of present high rates of taxes as long as we are at war with Germany and Japan.
2. Reasonable tax adjustments when war cutbacks make factories and workers idle, to stimulate essential civilian production and employment.
3. Postwar rates which are below the point of discouragement.
4. A balanced budget after the war.
5. A long-range plan of debt retirement.
6. The taxing power confined to the raising of revenues, and not misused for social or economic adjustments.
7. Every citizen made aware by direct taxation of the cost to him of his government.
8. A tax act that will be simple and understandable to the taxpayer.

### Conclusions

History's ruthless records show that any nation which overspends and teaches its people to look to the government for support brings about a progressive moral decay of its citizens. It is not the way of free people to seek something for nothing. Nor does individual freedom survive when expanding government consumes private enterprise.

In the decisions we make during the next few years we shall write the history of many generations. In our care is the priceless heritage that makes us, the people of these United States, masters of our government, not its servants.

It is the grave responsibility of industrial leadership to unite in a common program, devised without pride of authorship, to seek courageously a balanced budget and repayment of our debt. Industry cannot afford to sit silently. It must exercise its stewardship of the nation's jobs to protest against wanton spending and destructive taxation. It must insist that we preserve our moral integrity by meeting our financial responsibilities.

We need leaders who are willing to face the facts—tell the people the truth—admit the costs which must eventually be paid by all of us—and lay plans for all of us to pay.

"Those who expect to reap the blessings of freedom must, like men, undergo the fatigue of supporting it."

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# The Role of Organic Peroxides in the Processing of Rubber—II

Warren B. Warden[1]

THE fluidifying action of peroxide oxygen on rubber and rubber latex has resulted in many products of commercial importance, in much enlightenment on the chemistry of rubber, in many informative publications and articles, and in considerable confusion as to terminology. A number of different terms have been used to describe this action of oxygen on rubber. Some of these are: "degradation", "disaggregation", "resinification", "plastification", "oxido-plasticization", and "depolymerization." As the exact mechanism of the phenomenon has not as yet been clearly defined, the writer can see no reason why a term descriptive of the result rather than of the mechanism would not be preferable. As used herein, "fluidification" refers to the oxido-altera ion, either spontaneous or induced, of rubber or rubber latex with resultant softening and lowering of the solution viscosity.

## Fluidification

FLUIDIFICATION PROCESSES. The processes for accomplishing the fluidification of rubber have been described primarily in the patent literature. Some of them are now commercial processes, and some of the products are available on the market. Others of the patented processes would hardly seem to be practical commercially at the present time. No attempt has been made to compile a complete exposition of these patented processes or products, but some typical examples are cited.

Crude rubber in an oxygenated and permanently softened form may be produced by incorporating various oxidizing agents with the rubber latex, coagulating the latex, then washing, and drying in the usual manner. Examples of patented oxidizing agents include: hydrogen peroxide (28),[2] peroxides of sodium, potassium and barium, chlorates of the alkalies and alkaline earth metals, urea peroxide (29) and organic peroxides of the formula $R_1C\text{-}O\text{-}O\text{-}O\text{-}COR_2$ where $R_1$ and $R_2$ are aromatic or aliphatic radicals (30). The fluidification of dry crude or reclaimed rubber or of artificial rubber dispersions has been accomplished with peroxides, anhydrides of dibasic acids, fatty salts (31, 32), peracetic acid (33, 34), cobalt linoleate (35-37), and chlorostannic acid (38).

The degree of fluidification can be controlled, depending on the product desired, by adjusting the amount of oxidizing agent, the time, and the temperature to yield a given viscosity index. Heat, of course, speeds up the reaction, but must be used cautiously for the manufacture of most products. Various additive agents besides oxygen-yielding substances have been mentioned. These include antioxidants, various hydrazines and anhydrides, and metal soap catalysts. The fluidified rubber may be used alone, in latex form or in various solvents, or it may be mixed in various proportions with ordinary crude or reclaimed rubber.

FLUIDIFIED RUBBER PRODUCTS. Various products have been obtained by these and similar fluidification processes. The oxygenated rubbers are said to make superior adhesives and rubber cements. They are usually soluble in most organic solvents, particularly of the petroleum, coal-tar, or chlorinated varieties, but they are only partially soluble in alcohol and acetone. It is claimed that a cable covering rubber which is more resistant to heat and corrosion can be made by fluidification of a crepe rubber to a molecular weight by the Staudinger viscosity method of 10,000 to 15,000 followed by mixture with two parts of filler (talcum) and 0.1-part of sulphur per part of rubber (32).

The oxygenated rubbers have found some application in the paint industry, particularly in Britain (35-37). It is claimed that certain types form a flexible hard coating and that they also work well with other film-forming materials, i.e., linseed oil. Other applications of oxygenated rubbers include lacquers, varnishes, moldings, and insulation coatings (31-32, 34). One patent (38) mentions the use of fluidified rubber for the production of thermoplastic resins and of artificial pearls and mother-of-pearl. Chlorinated rubber solutions of lower viscosity have been prepared by starting with a partially fluidified rubber or by oxidation during the chlorination process (39-40). It is also claimed (41) that heat-liquefied oxygenated rubber serves as a dispersing aid for incorporating carbon black and pigments into rubber formulations.

THE MECHANISM OF FLUIDIFICATION. The mechanism of the oxido-transformation of rubber has received much attention by a number of investigators in the recent literature. The problem is highly involved, and no comprehensive explanation commensurate with all the observed facts has been forthcoming although some excellent studies have been reported. It is beyond the scope of this paper to cover thoroughly all of this work. Some of the more important concepts are briefly discussed, however, because this mechanism relates somewhat to current problems in the synthetic rubber and other high polymer fields and because organic peroxides are involved not only in fluidification, but also in the plasticization and possibly the reclamation of rubber.

"Depolymerization" was for years accepted as the obvious explanation for the oxido-softening of rubber, even before the general relation between molecular weight and solution viscosity was established. Until recently little attempt was made to explain just how and where the oxygen attacked the molecule to cause depolymerization. However Dufraisse (12)[3] in 1937 did very forcefully attack the theory, stating that one is not justified in assuming that a material is depolymerized unless there is evidence that the molecules are actually split. He contended that ordinary molecular weight measurements cannot be considered as entirely trustworthy because of inaccuracies when applied to macromolecular system. Among other things, he also pointed out that, in general, peroxides are powerful polymerization catalysts, particularly for the dienes and other substances similar to isoprene, and he raised the question as to why the peroxides should reverse their normal catalytic action in the

[1] Chemical engineer, 13 Summer St., Bradford, Pa.
[2] Bibliography references appear at end of this article.
[3] See our Dec., 1944, issue, p. 311.

special case of rubber to become suddenly depolymerization catalysts.

Two other possible mechanisms have received consideration in the past. The oxidizing scission theory of Staudinger (42-43) postulated a splitting of the macromolecules while still retaining the isoprene unit identity, in the following manner: $(C_5H_8)_{1000} \xrightarrow{O_2} 2(C_5H_8)_{500}O$. Dufraisse's theory of resinifying polymerization (11)* postulated that one component or portion of the rubber is more readily polymerized under the influence of oxygen than the others and is thus flocculated and finally disappears insofar as structural resistance is concerned, which results in gradual fluidification.

The above represents briefly the principal thoughts on the mechanism of the fluidification of rubber as of about 1938. In the last five years much has been learned regarding high polymers, oxidation reactions, and the physical chemistry of macromolecular systems in general. Some of these newer data have clarified and verified certain concepts; while other observations would seem to refute or at least fail to support any of these theories.

Some of the results and opinions pertinent to the mechanism of fluidification which have appeared in the recent literature are listed below:

(a) Refinements in the methods of estimating the average molecular weight of macromolecular systems have been made. The fact that the reduction of solution viscosity in any one given solvent is actually due to a reduction in average overall chain length of the soluble rubber macromolecules has been verified by osmotic pressure and ultra-centrifuge test data. All three of the accepted methods of estimating molecular weight (osmotic pressure, viscosity, and ultra-centrifuge) are subject to the same criticism, however, in that they all depend on measurements made on dilute solutions of the rubber.

(b) In highly concentrated rubber solutions the oxygen reactions are aggregative (oxido-vulcanization); while in more dilute solutions fluidification takes place (44).

(c) Some commercial antioxidants, while retarding the oxidation of vulcanized rubber, actually catalyze or promote the oxidation of raw rubber in the light (8). Phenyl-beta-naphthylamine (AgeRite Powder) was reported as being particularly offensive either with or without fillers. On the other hand sulphur, benzidine, and hydroquinone retard the oxidation of raw pale crepe.

(d) Houwink (45) has postulated a net structure as being formed in storage by cyclization or polymerization, in which the rubber molecules are cross-linked by primary valence bonds; then this net structure is broken by "oxygen depolymerization."

(e) Lastly, the very informative work of Farmer, *et al.*, (46-48) has shown that the alpha-methylene carbon is most prone to oxygen attack, forming first the hydroperoxide. The double bond is only attacked at an appreciable rate at a later stage in the oxidation. Thus the degree of olefinic unsaturation in the early stages of the oxidation remains intact.

Dufraisse's resinifying polymerization theory would seem to be refuted by (a) and (e), and it fails to account for (b) or (c). In light of present knowledge it is difficult, in fact, to visualize any polymerization mechanism as being wholly responsible for the observed results.

The concept of depolymerization or oxidative scission involving the breaking of primary valence bonds would seem to be out of line with the quantity of oxygen required to yield the observed decreases in solution viscosity. In order to decrease the viscosity by one half a minimum of 0.0005-part of oxygen is required under the theoretical optimum conditions of Staudinger. Note that this is true only if each oxygen atom is used most efficiently and each macromolecule attacked is split exactly in half, all of which is highly improbable. Yet the oxygen required experimentally to decrease the viscosity by one half has been reported to be only 0.0002-part. Also unexplained by either a true depolymerization or oxidative scission mechanisms are results (b), oxido-vulcanization in more concentrated solutions, and (c), the catalytic action of some antioxidants in raw rubber.

While not purporting to postulate a complete new theory, the writer would like to suggest that there is a relation between the anomalous behavior of rubber when put into solution and the mechanism of fluidification. The portion of rubber which is soluble depends on the history of the rubber and on the nature of the solvent. The addition of a small amount of a polar compound, alcohol, to a non-polar solvent, hexane or benzene, will greatly increase the ratio of sol (soluble) to gel (insoluble) rubber and will result in a lower solution viscosity. The gel would appear to consist of a three-dimensional network of rubber cross-linked molecules. However, contrary to Houwink's hypothesis (45), the bonds which hold the gel or network together cannot be chemical bonds because of the ease with which they are ruptured by a polar solvent (49). The gel rubber is more vulnerable to oxygen attack (50), and the gel structure disappears and blends into the medium in direct proportion to the extent of the change (51). It has been observed (52) that a greater solvation effect is noted when a polar compound is added to a solution of low molecular weight. Either milling (53) or fluidification (54) breaks the gel structure, increasing the sol to gel ratio and decreasing the solution viscosity for any given solvent.

These facts would indicate that the rubber molecules contain active centers (55) which promote cohesive forces of various strengths among certain of the macromolecules. These active centers may be due to polar groups, or they may represent the centers of force fields that are not localized about any particular groups on the molecule (56). The fact that the ash and protein portions tend to concentrate in the gel might be significant. The number of these active centers is probably relatively small and therefore would not materially affect the overall average molar cohesion measurements (van der Waals bonds). It would only take a few active centers to tie up a large number of macromolecules into a gel structure by cross-linkages. It is postulated that a-c (active center) bonds of varying strengths between adjacent macromolecules result, depending on the size of the macromolecules, relative position of the macromolecules, and the nature and the relative positions of the active centers. Thus any two or more rubber molecules might be associated by forces varying from the relatively weak van der Waals forces to bonds approaching the cohesive force of a primary valence bond.

When a sample of rubber is put into solution, the solvent is able to neutralize the weaker bonds, causing disgregation depending on the strength of the solvent. However certain of these cohesive forces are strong enough to withstand breaking even by a polar solvent, which accounts for the gel structure. It is also perfectly conceivable that two rubber macromolecules might be associated linearly and for all practical purposes go into solution as one large molecule. In fact how can one be sure that any solution does not contain some rubber molecules firmly associated by other than primary valence bonds into a seemingly larger macromolecule?

It is suggested that part at least of the fluidifying action of oxygen on rubber is the neutralization of these a-c bonds, rather than the actual scission of primary chemical bonds. The action might be similar to the neutralization of the weaker association bonds by a solvent (the mechanism of solvent action). The classical representation of the theory of antioxygenic action might help to visualize the idea. Let $A \cdot \cdot A^1$ represent two rubber macromolecules associated by an a-c bond. $A \cdot \cdot A^1$ combines with molecular oxygen, both being in an activated state due to light, breaking the a-c bond and forming a primary peroxide $A(O_2) + A^1$. The antioxidant B then combines with the primary peroxide to liberate the original components and the energy of activation as follows:

$$A \cdot \cdot A^1 + O_2 \rightarrow A(O_2) + A^1$$
$$A(O_2) + B \rightarrow A(O_2)B \rightarrow A + O_2 + B$$

It is suggested that in the course of this or a similar action the a-c bonds are neutralized or spread apart so that the subsequent solvent action can disgregate the weakened bonds.

This mechanism, while just an idea, as yet, fits the experimental observations rather well. No change in the molecule itself, either polymerization or depolymerization, is postulated. The oxygen is liberated to be used again, which might account for the very small oxygen intake necessary for large solution viscosity reductions. This mechanism also accounts for result (c), wherein some commercial antioxidants catalyze fluidification in raw rubber in light, but retard the oxidation of vulcanizates. The cross-linkages in vulcanized rubber are primary valence bonds, and here a true oxido-depolymerization or scission is necessary to break the network. Obviously anything that helps bring activated oxygen into intimate contact with either of these rubber systems will accelerate the fluidification mechanism, whether it be actual chain scission or the disruption of a-c bonds. Thus the organo-metallic siccatives or "driers" or the peroxides should be, and are potent catalysts.

At the same time, but at a rate depending on other factors such as heat and light, some of the peroxidic oxygen attacks the ethylenic bonds, causing oxygen bridges, cyclization, or polymerization. In concentrated rubber solutions the molecules are close together, and the aggregative reactions predominate. In more dilute solutions the cohesive forces are extended and more readily attacked, while the molecules are further apart and therefore less prone to bridging and cyclization reactions. Lastly this mechanism would seem to offer an explanation for the enigma of organic peroxides, which are normally polymerization catalysts, seemingly acting as depolymerization catalysts in rubber systems, as no true depolymerization is postulated. Another possible answer to this enigma is that the rubber system is already in a polymerized state and therefore not subject to normal monomeric diene polymerization reactions.

The thoughts expressed above in no way exclude some oxido-scission of primary chemical bonds at the same time. Rather it is felt that the oxido-softening of rubber is the result of a number of different oxidation reactions which probably supplement each other. The writer believes that the neutralization of these secondary cohesive forces, however, is a predominating factor, particularly during the very early stages of the process of fluidification.

### Plasticization

The above thoughts also apply to plasticization. It has been definitely established that the plasticization of rubber is a chemical rather than a physical phenomenon (7, 57-61). Cotton (58) and Busse (57) independently established conclusively that oxidation does take place during mastication and that milling by itself in an inert atmosphere such as nitrogen appears to be incapable of plasticizing rubber. Shacklock (62) noted that the electrical charges developed by friction during milling are indispensable, and their suppression prevents plasticization. According to experiments by Cotton, later confirmed by Shacklock (63), the active intermediate in plasticization is not ozone. On the other hand the presence of peroxides by the Russell effect has been demonstrated by Busse. Lastly, Dufraisse and Vieillefosse (59) have studied the subsequent influence of these peroxides formed during milling.

All of the above, together with many other supporting data and observations, clearly define the nature of the plasticization of rubber as an autooxidation mechanism involving peroxides formed under the influence of the high potential electrical charges caused by friction during the milling operation. The fact that terrific air pressures are momentarily created and the fact that the rubber molecules are under strain which favors attack by oxygen are considered to be important contributory factors. Thus the plasticization of rubber by milling would seem to be a special case of fluidification, wherein the oxido-transformations are greatly accelerated. The end result is the same in that the rubber is softened, the sol/gel ration increased, the solution viscosity decreased, and the apparent average molecular weight decreased. In the one case the energy of activation comes from light and in the other from mechanical work through the medium of electrical charges caused by friction.

If such is the case, plasticization is nothing more than a controlled fluidification, which, as discussed above, is probably a combination oxido-scission and breaking of secondary cohesive forces between the rubber molecules. Why then expend costly power in a milling operation to assist the more rapid generation of the active agents of plasticization—the organic peroxides? Why not introduce controlled proportions of an organic peroxide and let the mill confine itself to its natural function of mixing at a considerably lower net cost? It is realized that this question has been considered by the rubber chemist in the past. One serious drawback to the idea has been the lack of a commercially available peroxide that can be easily and safely handled on the mill and that will not incorporate undesirable adulterants to the stock or introduce deleterious after-effects.

The advent of stearyl peroxide would seem to make the question worth reconsidering. The stearyl peroxide can be safely and easily added in controlled proportions, and no undesirable adulterants are incorporated in the mix, as the residue is stearic acid which would be added to most formulations anyway. The effect of the stearyl peroxide on the finished vulcanizate has previously been considered. The quantity and conditions could be controlled so as to decompose essentially all of it on the mill, or, if desired, so as to allow some carry-over to act as an accelerator. In any case there should be no residual peroxide left in the finished vulcanizate and, therefore, no deleterious effect on aging. Relatively small amounts are needed, and the saving in time of milling and power required over the difference in cost between stearyl peroxide and stearic acid is worthwhile. The simultaneous incorporation of an antioxidant and/or an aromatic hydrazine might be desirable, or the use of a catalyst or inhibitor to effect the rate of decomposition of the peroxide might be necessary, depending on the

temperature of milling, stock, and size of the charge. Some preliminary experimental work has been done along these lines, particularly with Buna S, which is much more difficult to plasticize than natural rubber. These data, when supplemented and verified, will be presented in a later paper. There might also be an advantage in using an outside peroxide rather than relying on the natural peroxides formed during ordinary mastication, in that the natural peroxides are relatively higher molecular weight and not so readily controlled or so surely destroyed during vulcanization.

A recent (1940) patent represents an extreme in oxido-plasticization (64). Crude rubber is subjected to an oxidizing atmosphere (air) under 200 pounds per square inch pressure at a temperature of 212-400° F. for 30 minutes to six hours. The advisability of such a drastic procedure for most ordinary formulations is highly questionable. A more practical modification of the idea lies in the successful practice of producing so-called softened rubber on the estates. Here thin sheets of rubber are subjected to an oxidation process by means of which a saving is effected in the milled energy required for subsequent processing in the factory. Also of interest is Spirk's paper (65) on preservation of the plasticity of butadiene polymers by treatment with oxygen in the process of anti-cyclizing agents.

When asphaltic softeners or compounding ingredients such as mineral rubber are used, there is another possible advantage to the use of stearyl peroxide. The stearic acid is reported to serve as an activator of penetration of the bituminous materials with rubber (66), and the peroxides inhibit undesirable gelling.

### Reclaiming

The effects of oxygen on the reclaiming of rubber have recently received considerable attention. According to Essex (67), when scrap rubber is reclaimed by the alkali process, a more plastic product is obtained if oxygen is present during some stage of the process. Under temperature and time conditions which otherwise give a rough product difficult to plasticize and refine, the accessory use of oxygen yields a product easily and smoothly plasticized and refined. Comparative tests of whole tire reclaim made by the standard alkali process and by the alkali-oxygen process gave vulcanizates of about the same quality both before and after aging.

In one experiment (68) a tire stock was subjected to satisfactory heat treatment (alkali process) for 15 hours at 370° F. When the digester was blown down and opened after four hours, then the charge reheated one hour more, the total of five hours' heating gave a product of the same quality as the corresponding product heated 15 hours without interruption. This, of course, represents a considerable saving.

Essentially the same thing can apparently be done with organic peroxides. Autoxidized terpene oil (69), peroxides, anhydrides of dibasic acids, fatty acid salts (31), etc., have been patented. A British patent claims that vulcanized rubber can be reclaimed by heating in the presence of oxygen and monarylhydrazine (70).

It would seem that the fatty acid peroxides would be suitable as a source of oxygen to aid reclaiming. A stearyl peroxide water dispersion could be slowly introduced into the bottom of the digester. Nascent oxygen would immediately be released upon contact with the alkali, and the stearic acid would react to form a soap. The amount of dilution or alkali lost by neutralization would be negligible. Obviously the economics of such an application will bear careful consideration.

### Conclusions

The principal possible commercial applications of organic peroxides in the processing of rubber have been grouped and discussed. These include vulcanization or curing of natural rubber and some of the synthetic rubber-like materials, fluidification, plasticization, and reclaiming.

Attention has been called to the fact that some of the newer organic peroxides have certain definite advantages over the more common benzoyl peroxide for use in rubber. Some physical data have been presented on stearyl peroxide, which would seem to be the most logical of the newer peroxides for such applications. It is cheap, can be easily and apparently safely handled and compounded, and contains no undesirable adulterants.

The curing times and physical properties of an alkyd resin synthetic rubber-like material, Paraplex X-100, were shown to be essentially the same when cured at 260° F. with stearyl peroxide or with the benzoyl peroxide dispersion now recommended.

The theories of the oxido-fluidification of rubber have been discussed and the thought expressed that the breaking of secondary cohesive forces between the rubber macromolecules as a supplementing factor to oxido-scission of chemical bonds is a prominent factor in the mechanism.

The advantages and cost of stearyl peroxide would seem to make the idea of partial oxido-plasticization worth reconsidering. It is proposed that a considerable saving in time and also in power for milling can be effected.

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# The Formation of Vinyl Polymers in Emulsions and in Suspensions—III

## Experiments on the Polymerization of Styrene in Agitated Emulsions . . .

S. Siggia,[1] W. P. Hohenstein,[2] and H. Mark[2]

IN TWO previous short papers (1, 2)[3] a few experiments on the polymerization of styrene in unagitated aqueous solution, suspension, and emulsion were reported. This article intends to present some data concerning the same reaction in *agitated* emulsions.

To get a preliminary insight into the mechanism of such emulsion polymerizations it becomes first of all necessary to carry them out under controlled conditions in a reproducible way. This is by no means simple. While it is comparatively easy to reproduce individual polymerization runs of styrene in solution or in the pure monomer phase regarding the amount of polymer formed at a given instant to within a few per cent., it is a rather difficult task to get a reproducibility better than 10 or 12% in emulsion. We therefore believe that the following experiments have only the character of an exploratory and orienting study, which allows the drawing of certain general conclusions on the reaction mechanism and which makes it clear how better experiments should be planned for a more conclusive investigation.

As a polymerization reaction in emulsion proceeds, the following quantities are becoming subject of measurement:

1. The amount of polymer formation during a certain time period.
2. The average degree of polymerization of this polymer.
3. The molecular weight distribution curve of this polymer.
4. The average particle size of the emulsion at any given time.
5. The particle size distribution curve of the emulsion at any given time.
6. The amount of catalyst left and the pH at any given time.

In the following we shall present a few experiments dealing with points 1, 2, and 4 and add some remarks about points 3 and 5. The change of pH during the emulsion polymerization of acrylonitrile has been recently followed and discussed by Fryling and Harrington (3).

### Amount of Polymer Formation

A number of styrene emulsions with different average initial particle size were prepared by varying the amount of ammonium oleate in the system. Table 1 gives a survey of the emulsions used for these measurements. Aliquot parts (36 milliliters) of these emulsions were introduced into test tubes (of about 50-milliliter capacity) which had been drawn out into a thin neck of about three millimeters diameter. The catalyst was then added; the tube sealed and put in a shaking device, which operated at constant temperature with the moderate speed of 50 shakings a minute. It should be mentioned here that the speed and mode of shaking are of considerable influence on the shape of the conversion curve and also on the total amount of monomer converted. We carried out all observations in the same shaking machine with the same rate of about 50 shakings a minute, but did not carry out any systematic investigation of the influence of rate or mode of shaking on the rate and amount of conversion. The tubes were withdrawn at definite time intervals; the necks opened and the contents poured into a dilute solution of acetic acid to break the emulsion. The coagulated polymer was filtered off and washed several times with methanol. Then it was redissolved in methylethyl ketone, reprecipitated with methanol and repeatedly washed with methanol and water until the washings were free from monomer, catalyst, or soap. The product was then dried and weighed.

The reproducibility of this method was tested by withdrawing several ampules at the same time and comparing the amounts of polymer formed. At low conversions (up to 20 or 25%) considerable variations were encountered, but as the reaction proceeded, the results could be reproduced to about 10 or 15%. Vinograd (4) recently studied the polymerization of soap-solubilized styrene with the pycnometer method, which offers the advantage of continuous observation and, very presumably, also of better reproducibility.

TABLE 1. CHARACTERISTICS OF THE STYRENE EMULSIONS USED

All emulsions contained: 180 ml = 10 mols water
19 gram = 0.18-mol monostyrene
2.8 gram = 0.034-mol sodium perborate
Molar ratio water to monomer 55.5
Molar ratio monomer to catalyst 5.3

The emulsions contained the following amounts of ammonium oleate:

| Run No. | Grams of Soap | Mols of Soap | Molar Ratio—Monomer/Soap | Molar Ratio—Soap/Monomer |
|---|---|---|---|---|
| 1 | 0.9 | $3.0 \times 10^{-3}$ | 60 | $1.67 \times 10^{-2}$ |
| 2 | 1.0 | $3.3 \times 10^{-3}$ | 54.5 | $1.83 \times 10^{-2}$ |
| 3 | 1.1 | $3.6 \times 10^{-3}$ | 50 | $2.00 \times 10^{-2}$ |
| 4 | 1.2 | $4.0 \times 10^{-3}$ | 45 | $2.22 \times 10^{-2}$ |
| 5 | 1.3 | $4.3 \times 10^{-3}$ | 42 | $2.38 \times 10^{-2}$ |
| 6 | 1.4 | $4.6 \times 10^{-3}$ | 39 | $2.56 \times 10^{-2}$ |
| 7 | 1.5 | $5.0 \times 10^{-3}$ | 36 | $2.78 \times 10^{-2}$ |

Figure 1 shows some conversion curves of emulsions with different initial average particle radii (0.4, 1.6, and 3.6 microns). It can be seen that all curves have a definite inhibition period which increases with the initial particle size of the emulsion. An inhibition period was to be expected because, firstly, the monomer presumably still contained traces of stabilizers or other impurities and, secondly, air was present in these experiments. It seems that in emulsions which contain more soap and hence on the average smaller particles, the inhibitors are more rapidly disposed of than in less highly dispersed systems. Several reasons can be offered for this effect.

If the inhibitor is monomer soluble, it will take more time to diffuse out of a large globule than out of a small one; hence the critical inhibitor concentration at which the reaction proceeds rapidly is reached sooner in a highly dispersed emulsion. If the inhibitor is water-soluble, it may be that it is more rapidly destroyed in systems having a large specific interface area or it may be that emulsions containing a higher soap-monomer ratio are capable of a faster nucleus formation and, therefore, consume the inhibitor more rapidly. The last explanation would be supported by Fryling's (3) views of the action of the soap micelles and by Vinograd's (4) measurements of the heat of activation of nuclear formation in soap solubilized styrene.

The inhibition period can be reduced by using highly purified monomer and by excluding oxygen from the system as much as possible (comp. 2), but we have no systematic results to offer in this respect as yet.

If one takes samples from the same emulsion (containing the same amount of inhibitors) and runs them at different temperatures, a significant decrease of the length of the inhibition period with increasing temperature is observed. Using the same approximative method as briefly described in a previous article

[1] J. Matiello industrial research fellow at the Polytechnic Institute of Brooklyn, present address General Aniline & Film Corp., research laboratory, Easton, Pa.
[2] Polytechnic Institute of Brooklyn, Brooklyn, N. Y.
[3] Bibliography items appear at end of article.

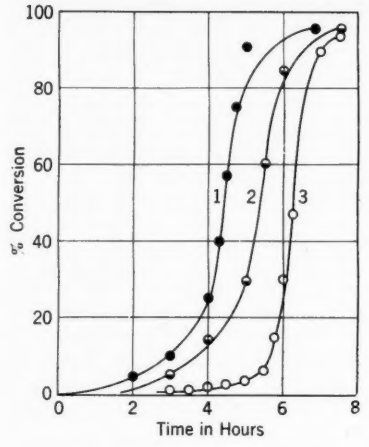
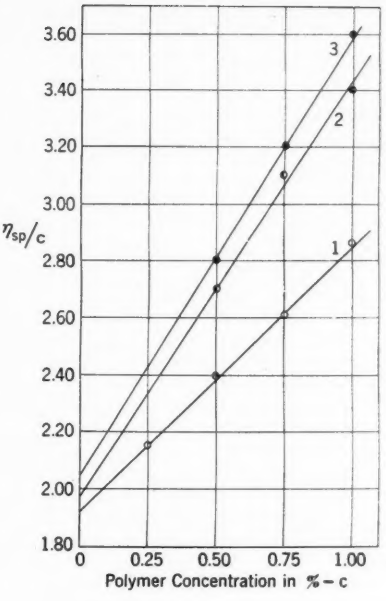



Fig. 1. Conversion Curves for Emulsion of Different Initial Particle Size



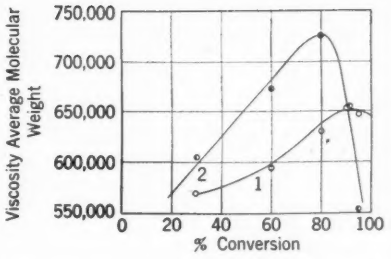




Fig. 3. Average and Instantaneous Molecular Weight of Five Samples

*(Left)*

Fig. 2. Intrinsic Viscosities of Three Fractions of α Polymerization

(2) one obtains for the activation energy of the initiation reaction values between 15,000 and 18,000 cal per mol. This seems to indicate that the initiation process in these agitated systems has about the same energy requirement as has been deduced by Vinograd (4) from the initial rate of the polymerization of styrene in unagitated soap solutions and by Frilette (5) from the inhibition period in such solutions.

**Average Degree of Polymerization of the Polymer Formed**

After the samples had been weighed, they were used to measure the viscosity average molecular weight of the polymer formed up to the instant of the withdrawal of the sample. In view of the orienting character of the whole investigation, no osmotic pressure or light scattering measurements were carried out, but the *intrinsic viscosity* was used to determine the viscosity average molecular weight. For this purpose the viscosities of four or five solutions of each sample were measured at 40° C. in toluene within the concentration range between c = 0.2 and c = 1.0%, and the specific viscosities $\eta_{sp}$ computed. Graphs of $\frac{\eta_{sp}}{c}$ *versus* c were then made, and by a straight line extrapolation the intrinsic viscosity $[\eta]$ of each sample was determined. Figure 2 shows as example one graph, representing three polymers withdrawn from a run at 4.75, 5.00, and 5.50 hours, which was started with 180 milliliters of water, 19 grams of monostyrene, and 1.4 grams of soap and polymerized at 70° C. This run is No. 6 in Table 1. The intrinsic viscosities of the samples are 1.92, 1.97, and 2.04 respectively.

These values were then converted into viscosity average molecular weights M by the equation

$$[\eta] = 1.22 \times 10^{-4} \times M^{0.71} \qquad (A)$$

The two constants in equation (A) were chosen from values available in the literature. We are very much indebted to L. Drake and R. Spencer, of the research department of Dow Chemical Co., Midland, Mich., who recently carried out more precise recalculations of these constants and recommended to us the above values. It must, however, be pointed out that all the polymers for which comparative osmotic (or light scattering) and viscosity measurements have been carried out and for which, therefore, values for the constants in equation (A) are available have been prepared either in the pure monomer phase or in a homogeneous solution. It is not impossible that a polymer formed in emulsion requires another set of constants, and we, therefore, do not think that the *absolute values* of the viscosity average molecular weights, as reported here, are very reliable. We believe, however, that the *relative* magnitude of these values is sufficient to allow the few conclusions which will be drawn from them in this section.

Table 2. Viscosity Average Molecular Weights M for the Polymers Withdrawn at Different Times during Several Runs

| | M Estimated from Intrinsic Viscosity after | | | | |
|---|---|---|---|---|---|
| Run No. | 4½ Hrs. | 5 Hrs. | 5½ Hrs. | 6 Hrs. | 7 Hrs. |
| 1 .... | ..... | ..... | ..... | 1,140,000 | 1,160,000 |
| 2 .... | .....[a] | ..... | 870,000 | 1,130,000 | 1,110,000 |
| 3 .... | 500,000 | 570,000 | 580,000 | 720,000 | 1,100,000 |
| 4 .... | ..... | 570,000 | 590,000 | 630,000 | 645,000 |
| 5 .... | 930,000 | 960,000 | 1,100,000 | ..... | ..... |
| 6 .... | 580,000 | 640,000 | 800,000 | ..... | ..... |
| 7 .... | 1,100,000 | 900,000 | ..... | ..... | ..... |

Table 2 contains the viscosity average molecular weights M of samples withdrawn at different times from runs No. 1 to No. 7, as listed in Table 1. It can be seen that in most cases (except runs 2 and 7) the viscosity average molecular weight (as measured here) increases as the conversion of monomer into polymer increases. The maximum viscosity average molecular weights of five runs (Nos. 1, 2, 3, 5, and 7) are of about the same order of magnitude: namely, 1,100,000;[a] while runs 4 and 6 yielded materials of a lower degree of polymerization. We cannot give any reasonable explanation for this fact because there was no evidence for any irregularity during these two runs as compared with the other five. This is one of the frequent instances in which uncontrollable effects occur during emulsion polymerization and which certainly call for further investigation and clarification.

The figures of Table 2 represent the M-values of the polymer formed *up to a certain time t or conversion z*. In order to correlate them with the conversion curve as discussed in the previous paragraph, they have to be transformed into differential or *instantaneous* values: namely, into the molecular weights of the polymer formed during a given period, say between the fifth and sixth hour of the reaction or between 55 and 65% conversion. The time average $\overline{M}$ of the viscosity average molecular weight M up to a conversion z is obviously given by

$$\overline{M} = \frac{1}{z}\int_0^z M(z)\,dz \qquad (B)$$

where M(z) is the instantaneous viscosity average molecular weight formed at the conversion z. Differentiating (B) with respect to z one obtains

$$M(z) = \overline{M} + z\frac{\partial \overline{M}}{\partial z} \qquad (C)$$

[a] If one would use the Staudinger equation $[\eta] = K_m M$ and apply a $K_m$ value of $4.5 \times 10^{-4}$, the maximum molecular weight obtained during these runs would be about M = 455,000.

In order to compute M(z) as a function of z, one first plots the values of $\overline{M}$, as indicated in Table 3, *versus* z and obtains curve 1 of Figure 3. Then after graphical estimation of $\frac{\delta \overline{M}}{\delta z}$ one uses equation (C) to calculate M(z) as a function of z, which is indicated in Figure 3 by curve 2. Comparing curve 2 of Figure 1 with curve 2 of Figure 3, it can be seen that the molecular weight of the polymer formed during the period immediately after the start of the conversion (before the fifth hour)—*acceleration* period—is comparatively low. This can be explained by the presence either of traces of inhibitor or of a chainbreaking addition compound between inhibitor and activated monomer. As the reaction reaches its full rate between t = 5½ and t = 6½, the molecular weight of the polymer formed at that time increases, and it is only during this period that the chains grow out to their proper length, and a material of maximum DP is produced. It must be emphasized that each instantaneous molecular weight is still a viscosity average over many species, because even under exactly defined macroscopic conditions, such as concentration of monomer, catalyst, inhibitor, etc., different active centers will grow out to chains of different length because of the statistical nature of all molecular processes. The polymer *at each given conversion* z is therefore already a mixture of chains of different length. To this heterogeneity is then superimposed the non-uniformity of the polymer formed in the *different periods* of the reaction as shown by curve 2 in Figure 3.

TABLE 3. TIME AVERAGE AND INSTANTANEOUS MOLECULAR WEIGHT OF SEVERAL SAMPLES

Run No. 4: Five Samples Withdrawn between t = 5 Hours and t = 7 Hours

| Time of Withdrawal Hours | % Conversion z at That Time | $\overline{M}$ from $[\eta]$ | $\frac{\delta \overline{M}}{\delta z}$ | $\overline{M}(z)$ of Polymer Formed at That Time |
|---|---|---|---|---|
| 5 ..... | 30 | 570,000 | + 1300 | 610,000 |
| 5½ ..... | 60 | 590,000 | + 1300 | 670,000 |
| 6 ..... | 80 | 630,000 | + 1300 | 725,000 |
| 6½ ..... | 90 | 655,000 | around zero | 655,000 |
| 7 ..... | 95 | 645,000 | — 1000 | 550,000 |

All this contributes to the fact that the final polymer, as accumulated throughout the whole reaction, is a rather inhomogeneous material and, particularly, contains a considerable amount of chains of inferior length, which according to recent studies of Harris (6), Kemp (7), and their collaborators may well be detrimental for certain mechanical properties of the material. In most of our runs the viscosity average molecular weight of the polymer formed up to a certain time increased slowly, but steadily during the reaction, indicating that a material of increasing DP is produced as the conversion proceeds. In some cases, however, it was found that, as the reaction proceeds further (conversions around and above 90%), M(z) decreases again and eventually assumes rather low values toward the end of the run. There are presumably several factors which contribute to this effect; two of them are the following:

(a) As more monomer is consumed, its concentration decreases and reaches comparatively low values around and above 90% conversion. In homogeneous systems the rate of the propagation reaction depends upon monomer concentration of an exponential power between 1.5 and 2.0; while the different termination reactions depend upon monomer concentration of an exponential power between 0.5 and 1.0. Responsible for the average molecular weight is the ratio of rate of propagation and rate of termination, which is roughly proportional to the first power of the monomer concentration. Hence decreasing monomer concentration depresses the average molecular weight of the polymer formed. This conclusion, of course, cannot be rigorously applied to emulsion polymerization, the kinetics of which are not known, but it seems not unreasonable to assume that, in general, a decrease in monomer concentration will always lead to a lower molecular weight.

(b) During the whole course of the reaction, decomposition products of the catalyst (mainly oxygen) can act as chainbreakers or transfer catalysts and therefore influence the degree of polymerization of the product. It is conceivable that toward the end of the reaction there are relatively more such decomposition products present per unit number of growing chains than at lower conversions. This leads to a lower number (and also viscosity) average molecular weight of the polymer formed during this last period of the polymerization.

The ideal situation would be if $\overline{M}$ were represented by a horizontal straight line in the graph of Figure 3, because then the second term in equation (C) vanishes, and the instantaneous molecular weight M(z) becomes constant and equal to the $\overline{M}$; the same type of polymer would be produced throughout the reaction. This, however, seems practically never to be the case in emulsion polymerizations, which have conversion curves of the type shown in Figure 1.

Another indication of the distinctly heterogeneous nature of the polymer formed in the course of such a reaction can be obtained in the following way. The samples withdrawn from run No. 1 after six and seven hours have intrinsic viscosities of 2.57 and 2.87 respectively and consequently (as shown in Table 2) have molecular weights which are not far apart from each other. However if one follows the procedure of Huggins (8) and computes from the slope of their respective $\frac{\eta_{sp}}{c}$ *versus* c plots the k' constants characteristic for these two polymers, one arrives at values of 0.37 and 0.28 respectively. In the sense of Huggins' interpretation and of previous investigations by Flory (9) on polyisobutylene, Alfrey and Bartovics (10) on cellulose acetate and styrene, the k' constant characterizes a polymer solution with respect to the mutual hydrodynamical interaction between the molecules of the solvent and the submolecules of the polymer. If the two samples of run No. 1 have similar average degrees of polymerization, but widely different k' values, as they do have, it may be interpreted that either the molecular-size distribution is different or that the two polymers differ from each other in certain structural details of the chain. Another similar case is encountered if one compares the k' constants of the 4½-hour and 5-hour samples of run No. 5 (compare Table 2) which have very much the same average molecular weight, but distinctly different k' values: namely, 0.26 and 0.39 respectively.

These samples, as well as those of run No. 1, also show qualitatively rather different solubility characteristics. If one prepares a 1% solution of each in methylethyl ketone and adds methanol, the first precipitate appears at distinctly different amounts of methanol added, and the behavior of the two solutions throughout the preciptation is different.

The next logical step would have been to work out complete molecular weight distribution curves of the samples withdrawn at certain times during the different runs. These samples, however, were in most cases too small for such a further-going analysis, and we did, therefore, postpone this more elaborate study of the composition of the polymer formed up to a certain conversion. A knowledge (even approximate) of the molecular weight distribution curve of the polymer formed during the different periods of the reaction would be of considerable value for the interpretation of what happens during each of these periods.

#### Average Particle Size of the Emulsions

Another interesting question was how the average particle size of an emulsion and its size distribution curve affect the course of the polymerization reaction and whether the average size of the emulsified monomer particles remains constant throughout the process or changes as the liquid monomer is converted gradually into solid polymer. It was known from previous industrial work with emulsions of the Buna S and Buna N type that their average particle size is considerably smaller than that of rubber in native latex, and it is qualitatively apparent that the average particle diameter decreases during polymerization. The initial emulsions, as prepared by shaking the pure liquid monomer with a dilute soap solution, usually have a creamy color, which after polymerization shows a distinct bluish tint, indicating that during the reaction the degree of dispersion of the colloidal system has been increased.

There are several ways of investigating the average particle diameter of such suspensions and even to arrive at an approximate form of the particle size distribution curve of which the use of the optical dark-field microscope (11-12) and of the

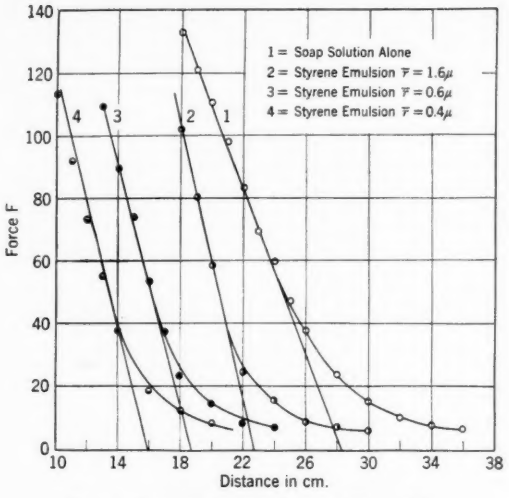



**Fig. 4. Compression Curve of α Soap Solution and of Three Emulsions**

ectron microscope (13) have been repeatedly demonstrated with great success. Considering the orienting character of this investigation, however, we felt that it would be recommendable to select a less time-consuming and complicated procedure in order to be able to determine approximately the fineness of a large number of emulsions at various degrees of conversion during the progress of polymerization. We therefore used a spreading method outlined a few years ago by Davey (14), which seems to give results quickly and reproducibly. They agree, at least in the first approximation, reasonably well with those of a direct optical or electronoptical counting.

The procedure follows: One uses a normal hydrophilic Langmuir balance and first determines the area which a certain volume (e.g., 0.01-milliliter) of a pure dilute soap solution requires because of the spreading of the surface active ammonium oleate. Curve 1 in Figure 4 shows a compression curve carried out with 0.0112-milliliter of a 0.5% ammonium oleate solution. One milliliter of this solution contains $5 \times 10^{-3}$ grams or $1.5 \times 10^{-5}$ mol soap, and the total amount of soap solution spread on the surface contains, thereof, $1.68 \times 10^{-7}$ mol soap, or about $1.0 \times 10^{17}$ molecules ammonium oleate. Evaluating curve 1 of Figure 4 in the conventional way, one arrives at an extrapolated length of the compressed film of 28.2 cubic meters. Multiplying this by the width of the tray (14.0 centimeters) one arrives at a spreading area $A_s$ for the soap of 39.5 $cm^2$. This, divided by the number of soap molecules spread out on this area gives a surface requirement of 39.5 $Å^2$ for a single ammonium oleate molecule, which compares with the figures found by N. K. Adam for potassium laurate (15).

Next, after the balance has been cleaned and readjusted, one spreads the same amount (0.0112-milliliter) of an emulsion, which was made up with a soap solution of the same concentration (0.5%), takes a compression curve with the emulsion, and determines the surface requirement $A_e$ of the emulsion. It is, in all cases, less than that of the original soap solution. This indicates that the globules of the emulsion *together* with the soap left free after emulsification cover a smaller area than the original soap did. This is obvious because a considerable amount of soap has been used up to cover the surface of the emulsified particles. Let us assume we have n globular particles, all of them having the same radius r; then $n4\pi r^2$ is the total surface of the emulsified phase, and the amount of soap bound by absorption on this surface will be proportional to it: namely, $\alpha n4\pi r^2$. The factor $\alpha$ takes into account that the density of the soap on a monomer particle may be different from the density of a soap layer on water. By comparing some of our results with direct optical observations, it seems, however, that under the conditions referred to in this article $\alpha$ was always in the neighborhood of unity. The soap contained in the original solution without monomer covers the area $A_s$; while the soap left free after addition of the monomer only covers $A_e$. Hence the difference $A_s - A_e = \Delta A$ must be made up by the soap, which is bound on the surface of the emulsified particles.

$$\Delta A = n\alpha 4\pi r^2 \qquad (D)$$

There are, however, the dispersed particles themselves which require a certain area on the surface of the trough, which will be proportional to their total cross-section $n\pi r^2$. This will therefore make it appear as if that much less soap has been adsorbed by the emulsified particles, and we therefore have to subtract it from the right side of equation (D). Hence one arrives at

$$\Delta A = n\pi r^2(4\alpha - 1) \qquad (E)$$

The number n of the dispersed particles, on the other hand, can be expressed by the amount g of monomer in grams and by the density s as

$$n \cdot \frac{4\pi r^3}{3} s = g$$

$$n = \frac{3g}{4\pi r^3 s} \qquad (F)$$

Introducing (F) in (E) one finally arrives at

$$A = \frac{0.75(4\alpha - 1)g}{rs}$$

which permits the calculation of the particle radius from the experimentally determined value of $\Delta A$ by means of

$$r = 0.75(4\alpha - 1)\frac{g}{\Delta A s} \qquad (G)$$

A few remarks may be added for the use of this method. One requirement for a smooth operation of the hydrophil balance is to make all confining barriers of the spread systems nonwettable. We found that ferric-stearate is a very convenient and effective agent for this purpose. A solution of this material in benzene was spread on all confining surfaces of the films, and the benzene was allowed to evaporate. The surfaces were then wiped vigorously with a cloth to remove all excess of ferric-stearate, and only a very thin layer remained. The spreading of the pure soap solutions does not offer any difficulties, but the handling of the emulsions requires considerable care. Calibrated lengths of capillary tubing were used as micropipettes for the measurements of the volumes of the emulsions to be spread. One should not allow the unknown to drop into the water surface from any height, but place the orifice of the capillary immediately above the surface of the tray. Even then it happens that parts of the emulsion submerge and do not properly spread on the actual surface. This difficulty occurs frequently if already a considerable amount of polymer particles, the density of which is slightly larger than unity, and if the emulsion does not contain mainly monomer as it does in the initial stages of the polymerization, has been formed. Such cases have to be discarded, and another spreading attempt has to be made after the trough has been cleaned and refilled.

When a monomer emulsion was made up with a given soap solution, the initial particle size of it was determined by obtaining $\Delta A$ from two spreading measurements (pure soap solution and emulsion) carried out immediately one after the other. The particle sizes of the emulsions withdrawn during the polymerization were obtained by determining again $\Delta A$ from two spreading measurements, the pure soap solution which was used to make up the initial emulsion, and the emulsion after polymerization had taken place to a certain extent.

Figure 4 shows four compression curves which have the usual shape and allow, with a reasonable degree of accuracy, extrapolation of the straight line part down to the abscissae. Curve 1 represents a soap solution and leads, as discussed above, to a satisfactory value for the surface requirement of a single ammonium oleate molecule. The other three curves reflect the behavior of three monostyrene emulsions and show that

smooth compression curves can be obtained with such systems. It may be noted that the linear (high pressure) portions of these curves are somewhat steeper than for the soap solution alone. As this was almost invariably observed with all emulsions, it seems to be no experimental error, but may reflect the fact that an emulsion containing particles of colloidal size is somewhat more difficult to compress than a soap solution. Table 4 shows the figures obtained with these three curves, and the approximate average particle radii derived from them under the assumption that both $\alpha$ and s in relation (G) are close to unity. In this case the equation reduces to

$$r = \frac{2.25g}{\Delta A} \qquad (H)$$

where g has to be measured in grams and $\Delta A$ in $cm^2$ in order to get r in cm. It can be seen that the average particle radii are in the range of microns as is to be expected for a system of the described properties.

TABLE 4. AVERAGE PARTICLE SIZES AND OTHER CHARACTERISTICS OF SEVERAL SAMPLES

Average Particle Radii Derived According to Equation (A)
Width of the Trough, 14.0 Centimeters

| Length of Soap Film in Cm | Length of Emulsion Film in Cm | $\Delta L$ in Cm | $\Delta$ in $Cm^2$ | g in Gram | $\bar{r}$ | Curve No. |
|---|---|---|---|---|---|---|
| 24.8 | 22.6 | 2.2 | 31 | $2.23 \times 10^{-3}$ | $1.6 \times 10^{-4}$ | 2 |
| 24.7 | 18.7 | 6.0 | 84 | $2.25 \times 10^{-3}$ | $0.6 \times 10^{-4}$ | 3 |
| 24.7 | 15.7 | 9.0 | 126 | $2.23 \times 10^{-3}$ | $0.4 \times 10^{-4}$ | 4 |

Using different amounts of soap, as indicated in Table 1, seven emulsions were made up from the same monomer, and their initial average particle radii were determined with the hydrophil balance. The results are given in Table 5, which also contains a number of other quantities of interest for the polymerization of such emulsions. In the first column there is the number of the emulsion which corresponds to that of Table 1; in the second, one finds the amount of soap used in mols. The third column contains the average particle radius, and the fourth the number of emulsified particles in the system; the fifth the total surface of the emulsified phase in one $cm^3$. In the sixth and seventh columns one finds the amount of soap adsorbed on the particle surfaces and the amount of soap which is still free (assuming that $\alpha$ is in the neighborhood of one). It can be seen from Table 5 that increase of the ratio soap to monomer leads to more highly dispersed systems, a fact which is well known from literature (11). This dependence of the average particle radius upon soap concentration is illustrated in Figure 5, where the average radii of the seven emulsions of Table 5 are plotted *versus* the soap concentration; one notes a very distinct decrease of particle size as the soap concentration increases.

TABLE 5. DATA ON DECREASE OF PARTICLE SIZE WITH INCREASING SOAP CONCENTRATION

| No. of Emulsions | Mols Soap Used | Particle Radius in $\bar{r} \cdot 10^4$ Cm | Number of Emulsified Particles in System | Total Surface of the Emulsified Phase in $Cm^2$ | Mols of Soap Adsorbed | Mols of Soap Still Free |
|---|---|---|---|---|---|---|
| 1 .... | $3.0 \times 10^{-2}$ | 3.6 | $1.1 \times 10^{11}$ | $1.5 \times 10^{5}$ | $1.0 \times 10^{-4}$ | $2.9 \times 10^{-2}$ |
| 2 .... | $3.3 \times 10^{-2}$ | 3.2 | $1.6 \times 10^{11}$ | $1.9 \times 10^{5}$ | $1.3 \times 10^{-4}$ | $3.2 \times 10^{-2}$ |
| 3 .... | $3.6 \times 10^{-2}$ | 2.6 | $2.8 \times 10^{11}$ | $2.3 \times 10^{5}$ | $1.5 \times 10^{-4}$ | $3.4 \times 10^{-2}$ |
| 4 .... | $4.0 \times 10^{-2}$ | 1.6 | $1.2 \times 10^{12}$ | $3.6 \times 10^{5}$ | $2.4 \times 10^{-4}$ | $3.8 \times 10^{-2}$ |
| 5 .... | $4.3 \times 10^{-2}$ | 1.4 | $1.8 \times 10^{12}$ | $4.3 \times 10^{5}$ | $3.0 \times 10^{-4}$ | $4.0 \times 10^{-2}$ |
| 6 .... | $4.6 \times 10^{-2}$ | 0.8 | $1.0 \times 10^{13}$ | $7.7 \times 10^{5}$ | $5.1 \times 10^{-4}$ | $4.1 \times 10^{-2}$ |
| 7 .... | $5.0 \times 10^{-2}$ | 0.4 | $8 \times 10^{13}$ | $1.5 \times 10^{6}$ | $1.0 \times 10^{-3}$ | $4.0 \times 10^{-2}$ |

Each of the emulsions was then polymerized in the presence of sodium perborate (compare Table 1) at 70° C. under moderate shaking in a number of equal ampules. At certain instances ampules were withdrawn, and the average particle size of the emulsion at that instance was determined by the above method. It must be pointed out that, as the polymerization proceeds, the emulsion becomes a more and more heterogeneous system. At the beginning there are only present soap solution and dispersed monomer particles. As the reaction proceeds, however, one has to consider soap solution, monomer particles, polymer particles, and the dispersed particles which consist of a solution of polymer in monomer or of polymer swollen in monomer. If one watches closely the spreading of emulsions, which contain already some polymer, it becomes evident that they are less homogeneous than the original monomer emulsion.

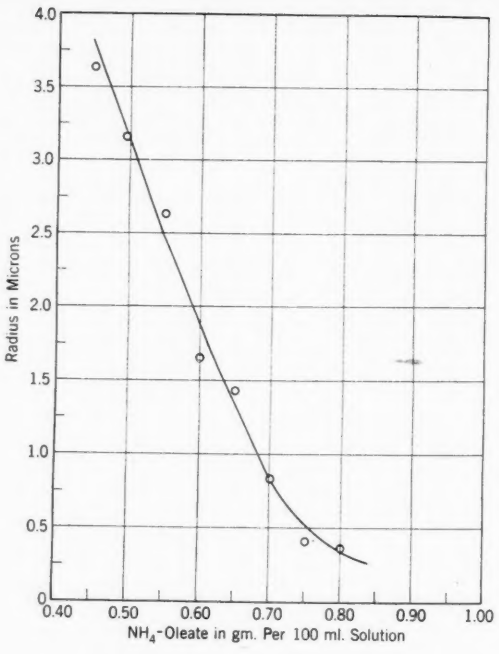



**Fig. 5. Influence of Soap Concentration on the Average Particle Size**

In all cases it was found that, as the polymerization proceeds, the average particle size of the emulsion decreases. Table 6 contains a few actually measured figures, and Figure 6 represents for several emulsions a plot of the average particle radius *versus* the time at which the sample was withdrawn. It can be seen that during the inhibition period the particle radius remains constant (in some instances even increases slightly); while it decreases sharply as soon as conversion of monomer into polymer sets in (compare the corresponding curves of Figures 1 and 6) and finally levels out at a figure much lower than the initial value.

TABLE 6. AVERAGE PARTICLE DIAMETER OF SAMPLES (CONTAINING FOUR GRAMS OF MONOMER) WITHDRAWN FROM RUN NO. 3 AT VARIOUS DEGREES OF CONVERSION

Initial Particle Radius Is 2.6 x $10^{-4}$ Cm

| Time of Polymerization in Hours | Weight of Polymer Formed in Grams | Degree of Conversion in % | Average Particle Radius in Microns |
|---|---|---|---|
| 2.0 | ... | ... | 2.7 |
| 3.0 | 0.10 | 3.1 | 2.4 |
| 4.0 | 0.16 | 4.9 | 2.4 |
| 5.0 | 0.68 | 21.3 | 1.8 |
| 5.25 | 0.98 | 30.7 | 1.6 |
| 5.5 | 1.38 | 43.2 | .. |
| 5.75 | 1.92 | 60.1 | 1.2 |
| 6.0 | 2.58 | 81.2 | 0.7 |
| 7.0 | 3.10 | 97.4 | 0.4 |

In order to find out whether this sharp decrease of the average particle size is directly connected with the chemical reaction in the system, we have run simultaneously samples taken from the same mother emulsion with and without catalyst under otherwise identical conditions, such as soap concentration shaking, temperature, etc. Emulsions from ampules not containing any catalyst did not show any noticeable change in average particle radius. In fact if there were any significant change at all, it indicated a slight increase in particle size, due presumably to some agglomeration during the prolonged shaking. All emulsions, however, in which conversion of monomer to polymer took place exhibited a drastic drop in the average

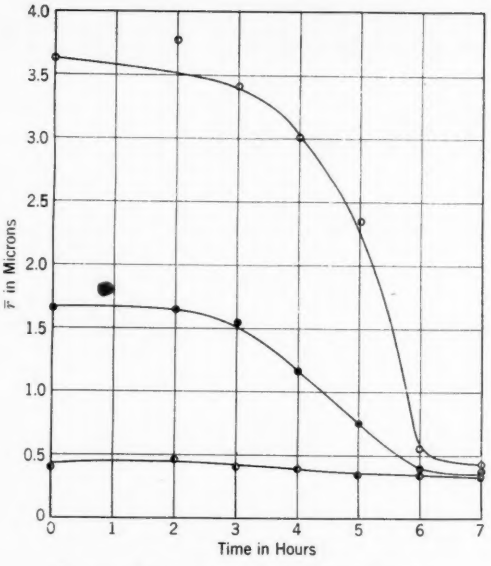



**Fig. 6. Decrease of the Average Particle Size of Emulsions during Polymerization**

particle radius, as indicated in Table 6 and Figure 6. In some cases the final average radius was as small as 500 Å (0.05-micron) although, in general, under the experimental conditions used in this study the final average particle radius was around 0.3-0.5-micron, and the ratio between initial and final radius about ten. This shows that at the end of the polymerization one has about a thousand times more particles present than at the beginning.

If one withdraws from one set of ampules two at a certain intermediate time (e.g., 5½ hours) and intermediate conversion (say 50%), measures the average particle size of one emulsion, adds an inhibitor to the other, and runs this one for another five or six hours, no additional conversion takes place, and no additional particle size drop has been observed, which shows again that particle size decrease is intimately connected with the chemical process of polymerization.

It seems that this experience together with the experimental results and ideas of Fryling, Vinograd, and their collaborators (3, 4) can be used to suggest qualitatively a mechanism for emulsion polymerization which localizes the different elementary steps, such as initiation, propagation, and termination of the growing chains outside of the *large* particles of the initial monomer emulsion. In the next article we shall try to advance such a mechanism and discuss it in the light of our general knowledge of polymerization processes.

The authors wish to express their thanks to A. Weinerman for his cooperation and to J. Mattiello, of Hilo Varnish Corp., Brooklyn, N. Y., and the Whitney Blake Co., Hamden, Conn., for their support of this work.

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## Rubber Chemicals in Postwar[1]

THE *India Rubber Journal* features "Rubber Chemicals in the Postwar Period—The Trend of Accelerators and Antioxidants" by T. G. Crane. He begins by saying that in talking of rubber chemicals postwar, one thing of which he is convinced is that chemistry is going to play a much more useful part in rubber manufacture than previously evident. He then pays tribute to Farmer and his coworkers, of the British Rubber Producers' Research Association at Welwyn, and states that in his opinion, only by understanding the fundamental behavior of the rubber molecule shall we be able effectively to devise new and useful chemicals, new processes, etc. Empirical methods have brought us a long way and have served us well, but further technical achievement may only become apparent when chemical and rubber manufacturers direct their researches with a full knowledge of the mechanism of the several and complicated processes involved in vulcanizing rubber.

Rubber manufacture prewar on a million-ton basis and regardless of its geographical location consumed MBT as its main accelerator. This was produced in eight of the rubber manufacturing countries, and as an accelerator of vulcanization it performed its function extremely well. Besides were other well-known chemicals: DPG, MBT disulphide, thiurams, aldehyde amines, to say nothing of a host of derivatives of MBT, each designed to offer an alternative compromise in properties. Mr. Crane predicts a gradual reduction in the number of accelerators, although the total poundage required may be greater.

Emphasis in future accelerator developments will be in the direction of improving the resilience of synthetic rubbers. It is mentioned that it appears that sulphur combines less readily in GR-S than with natural rubber and that the combination, when it does take place, is believed to occur within the molecule in more than one direction; hence we aggravate certain of the known deficiencies of our raw material. Vulcanization of GR-S with powerful accelerators and with sulphur present in amounts considerably lower than usually regarded conventional is recommended since physical properties are improved and heat embrittlement upon aging at elevated temperatures is reduced. The author points out that during the last decade the tonnage of MBT disulphide consumed has more than doubled; whereas in the same period DPG consumption has remained approximately steady, with MBT increasing only about 30%.

Since the outbreak of war we have also witnessed the large-scale adoption of the sulphenamide type of MBT derivative, of which the outstanding example is cyclo-hexyl-benzothiazole sulphenamide, Mr. Crane states and adds that this material appears particularly suited to synthetic rubber compounding. In his opinion products of this type represent one step in the future accelerator development directed toward producing new accelerators that are stable in storage, safe to process, more powerful than any we know today in catalyzing the vulcanization process, and fugitive or non-persistent in character.

As for antioxidants, here, too, the position with synthetic rubbers in the picture is altering. Previous products have been based chiefly on naphthylamines, and although ketone amines were adopted during the early 30's, few of these antioxidants were effective in inhibiting the deleterious effects of copper and manganese on rubber, and few conferred outstanding resistance to flex cracking and light aging. Products based on complex diamines and certain of the newer ketone amines are mentioned as providing improved flex resistance. The production of new types of chemicals for use as rubber antioxidants is predicted.

Also mentioned are copper-containing chemicals as accelerators for GR-S, but the difficulty of using these materials with compounds containing some natural rubber has still to be eliminated. Vulcanizing agents other than sulphur, such as selenium and tellurium, have certain advantages, but there is little likelihood of their displacing sulphur as a general-purpose vulcanizing agent, according to Mr. Crane.

In conclusion he believes that chemical manufacturers, having attained a satisfactory standard of purity, will find it possible to produce their materials at a gradually decreasing cost, so that we may expect our rubber chemicals in 1950 to cost appreciably less than they do today.

[1] Abstracted from a paper read at a symposium on "Postwar Trends in the Rubber Industry," held October 30, 1944, by the London Section, Institution of the Rubber Industry, and reprinted in *India Rubber J.*, Dec., 1944, pp. 657-60.

# Special Report of Office of Rubber Director on the Synthetic Rubber Program

## Appendix A: Prewar Costs of Production for Plantation Rubber—III

Everett G. Holt

THE application of scientific agriculture to rubber plantations attained real headway during the 1920's. From discovery of high-yielding trees to development of clones and plantations took years to accomplish, and constant new advances up to the outbreak of World War II led to fears on the part of some estate interests that obsolescence of plantations would be much more rapid in future than in the past.

### Trend toward High-Yield Plantations

The percentage of large estates under high-yield trees was steadily growing up to the start of the war, as use of selected seeds and budded stock became fairly general. New planting in the countries allied in International Rubber Regulation was interdicted from 1934 through 1938, but replanting was permitted, and specific authority both to plant and to replant was granted for 1939 and 1940, after which again only replanting was permissible.

It may be said that the plantation rubber industry after 1933 was as different from its counterpart before 1922 as the 1914 plantation industry was different from the wild rubber industry which it had then vanquished. Conversion from old style to improved estates continued through 1941, although more gradually than the replacement of the wild rubber industry by plantations in the earlier period.

The following statistics, circulated by the International Rubber Regulation Committee in May, 1940, represent estimates of the I.R.R.C. concerning the acreage under rubber to the end of 1941 on the basis of expected plantings. Compared with earlier years, it may be seen that budded rubber was but a small part of the estate acreage in 1928, that budding was practiced on an increased scale thereafter, accounting for 19.1% of the estate acreage in 1938. At the end of 1941 it was expected to amount to 27.7% of the total estate acreage, 14.5% of the total estate and native acreage combined. Trees raised from selected seeds added further to the growing total of high-yield acreage.

These statistics indicate that estates accounted for 51% of the total planted rubber in 1928, 51.6% in 1932, 52.6% in 1938, and were expected to be stabilized at 52.4% after 1940. They indicate that estates were scheduled to replant gradually with high-yield trees, although their total acreage was fixed for the time being.

At the last meeting of the I.R.R.C. before Pearl Harbor the amount of new planting (exclusive of Indo-China) in 1939 was reported at 260,983 acres and in 1940, 146,244 acres, for a total increase of 407,227 acres during the two years, comparing with 431,000 acres expected increase in the table including Indo-China.

At the same December 2, 1941, meeting, the acreage replanted during the regulation period was reported as follows:

TABLE 19. ACREAGE REPLANTED UNDER REGULATION

| | |
|---|---|
| 1934 | 2,819 |
| 1935 | 17,512 |
| 1936 | 60,468 |
| 1937 | 90,065 |
| 1938 | 68,621 |
| 1939* | 139,444 |
| 1940 | 164,428 |

* Indo-China not included in 1939.

Since yields per acre as high as 2,000 pounds per year are considered feasible with high-yield trees, compared with an average under 500 pounds for all rubber in bearing, it is apparent that but for the war, operating costs on estates would gradually have been reduced materially by their conversion through replanting.

### International Exchange Rates

Fluctuations in exchange rates of the currencies of rubber producing and rubber consuming nations have had considerable influence on market quotations for rubber in the past. Devaluation of the currency in a rubber importing country may raise the quotations for rubber in its currency overnight.

Devaluation in an exporting country is not immediately reflected in higher costs in terms of its local currency, but over a period of several months or years should logically have this result as costs of living rise. The immediate competitive effect is the same as a reduction in costs, in terms not of local currency, but of all stable foreign currencies.

How much devaluation (or variation in exchange rates of a currency) influences world market prices depends upon the importance of rubber production or consumption in the country whose currency is affected.

Fluctuations of British and Dutch currency, as reflected in Federal Reserve annual average exchange rates from 1920 to 1939, are shown below. The domestic gold value of the United States dollar is also shown, based on the official Treasury buying rate for gold except for 1933, when its exchange value in then stable Swiss and Dutch currencies was the basis of the figure used.

TABLE 20. FEDERAL RESERVE ANNUAL EXCHANGE RATES FOR BRITISH AND DUTCH CURRENCY, AND DOMESTIC

(Gold Value of American Dollar)

| | British £ | Guilder | U. S. $ |
|---|---|---|---|
| 1919 | 4.426 | 0.394 | 1.00 |
| 1920 | 3.664 | .344 | 1.00 |
| 1921 | 3.849 | .336 | 1.00 |
| 1922 | 4.429 | .385 | 1.00 |
| 1923 | 4.575 | .391 | 1.00 |
| 1924 | 4.417 | .382 | 1.00 |
| 1925 | 4.829 | .402 | 1.00 |
| 1926 | 4.858 | .401 | 1.00 |
| 1927 | 4.861 | .401 | 1.00 |
| 1928 | 4.866 | .402 | 1.00 |
| 1929 | 4.857 | .402 | 1.00 |
| 1930 | 4.862 | .402 | 1.00 |
| 1931 | 4.535 | .402 | 1.00 |
| 1932 | 3.506 | .403 | 1.00 |
| 1933 | 4.237 | .517 | .78 |
| 1934 | 5.039 | .674 | .59 |
| 1935 | 4.902 | .677 | .59 |
| 1936 | 4.971 | .645 | .59 |
| 1937 | 4.944 | .550 | .59 |
| 1938 | 4.889 | .550 | .59 |
| 1939 | 4.435 | .533 | .59 |

The New York market prices and average U. S. import values per pound for rubber shown in Tables 1 and 2[1] are converted to the equivalent gold basis in the following table from 1931 through 1941.

TABLE 21. INDICATED GOLD PRICES FOR RUBBER (Cents per Pound)

| | New York Prices | | Import Unit Values | |
|---|---|---|---|---|
| | Table 1 | Gold Basis | Table 2 | Gold Basis |
| 1931 | 6.20 | 6.20 | 6.57 | 6.57 |
| 1932 | 3.47 | 3.47 | 3.50 | 3.50 |
| 1933 | 5.95 | 4.64 | 4.89 | 3.82 |
| 1934 | 12.93 | 7.63 | 9.80 | 5.78 |
| 1935 | 12.37 | 7.30 | 11.39 | 6.72 |
| 1936 | 16.51 | 9.74 | 14.93 | 8.81 |
| 1937 | 19.42 | 11.45 | 18.46 | 10.90 |
| 1938 | 14.70 | 8.68 | 14.10 | 8.32 |
| 1939 | 17.91 | 10.57 | 15.96 | 9.42 |
| 1940 | 20.24 | 11.95 | 17.37 | 10.25 |
| 1941 | 22.34 | 13.19 | 18.18 | 10.74 |

This table shows clearly that, in terms of domestic pre-1933 currency, the price of rubber has not increased since the 1929-1933 depression in anything like the degree popularly supposed. In terms of pre-1933 dollars the market price averaged above 12c for a year only in 1941; while the annual average import value did not exceed 11c for any year shown.

[1] Nov. issue, p. 187.

TABLE 18. I.R.R.C. ESTIMATES (MAY, 1940) OF ACREAGE IN FAR EAST UNDER RUBBER ON BASIS OF EXPECTED PLANTING

(1,000 acres)

| | Estates | | | Natives | | | |
|---|---|---|---|---|---|---|---|
| | Seedings | Budded Rubber | Sub-Total | Neth. Indies | Other Countries | Sub-Total | Total Far East |
| 1928 | 3,379 | 189 | 3,568 | 1,446 | 1,987 | 3,433 | 7,001 |
| 1932 | 3,471 | 590 | 4,061 | 1,674 | 2,140 | 3,814 | 7,875 |
| 1938 | 3,544 | 838 | 4,382 | 1,721 | 2,233 | 3,954 | 8,336 |
| 1939 | 3,464 | 1,018 | 4,482 | 1,796 | 2,333 | 4,129 | 8,611 |
| 1940 | 3,394 | 1,206 | 4,600 | 1,807 | 2,360 | 4,167 | 8,767 |
| 1941 | 3,324 | 1,276 | 4,600 | 1,807 | 2,360 | 4,167 | 8,767 |

It does not require an economist to see that in talking about price *after* currencies were devaluated, direct comparison with the prices before devaluation of currencies is unfair. Market prices have to a startling degree been affected by what is called inflation; too little care has been exercised to qualify statements regarding prices and costs from this standpoint.

The "Statistical Bulletin of the I.R.R.C." made note of the effect of gold values on London market prices under its section on prices, in the table reproduced in the following:

TABLE 22. LONDON STANDARD RIBBED SMOKED SHEET PRICES

| | Pence per Pound Price of Rubber | | Index of Price of Gold in London |
|---|---|---|---|
| | Sterling | Gold | |
| 1931 ..... | 3 1/16 | 2 2/3 | 108.9 |
| 1932 ..... | 2 11/16 | 1 11/16 | 139.0 |
| 1933 ..... | 3 1/4 | 2 7/32 | 147.0 |
| 1934 ..... | 6 3/32 | 3 23/32 | 162.0 |
| 1935 ..... | 6 | 3 19/32 | 167.3 |
| 1936 ..... | 7 3/4 | 4 11/16 | 165.1 |
| 1937 ..... | 9 1/2 | 5 23/32 | 165.7 |
| 1938 ..... | 7 7/8 | 4 3/4 | 167.8 |
| 1939 ..... | 9 | 4 29/32 | 182.6 |
| 1940 ..... | 12 1/8 | 6 25/32 | 197.8 |

There was a free market for gold in London until September, 1939, after which the market was regulated. The gold indices were taken from the "Monthly Bulletin of Statistics of the League of Nations" on the basis of the sterling price per fine ounce gold.

Practical business men, as well as the general public, are prone to think of their domestic currencies as having fixed values. It is believed that the devaluation of U. S. currency as well as foreign currencies needs constantly to be kept in mind in the period discussed in Tables 21 and 22.

#### Ocean Freight Rates and Insurance

The freight rates on rubber, from ports of the Far East to New York have on a few occasions been as low as $8 per ton, but the average peacetime rate has ranged from $12 to $15 per ton.

There has been a tendency for the rates to increase with rising prices of rubber and to decline with falling prices.

Rates have never been as low as 1/3c per pound except perhaps for occasional tramp steamers, and the customary peace rate has been between ½c and ⅝c per pound. The rate just before Pearl Harbor was approximately 1c per pound. In World War I the rate was at times as high as 4c per pound, but the volume of trade and attractiveness of rubber as a cargo make any such rates in future out of the question.

A great many factors enter into the question of ocean freight rates. The nature of the cargo, ease of handling, storage space per ton, and similar factors are general considerations for comparing one commodity with another. Rubber is a one-way cargo—the question of cargo on the outward leg of the voyage is an important consideration in connection with over-all round-trip costs.

Ocean routes for rubber from the Far East to the United States have varied tremendously in the period since 1933; at first most of the rubber came via the Mediterranean; later a large proportion was routed around Africa starting at the time of the Italian adventure in Ethiopia; World War II again shifted the route and rubber came directly across the Pacific and through the Panama Canal to New York.

The length of the routes and canal toll charges affected costs variously, but in an upward direction. And during all this period inflation effects of currency depreciation were probably affecting costs of shipping companies in a general way just as they were affecting costs and prices in many lines; seamen's wages followed a rising trend.

The risk that properly stored rubber will be damaged in transit is not large. Insurance claims result from improper storage causing overheating or breakage, from damage through breakage of other cargo, particularly oils, from salt water damage, from pilferage on docks, and from ordinary shipwreck. Insurance against mold in transit requires a special clause in the contract.

The insurance charge on rubber was a very small cost item ranging from 1/20c to 1/40c per pound in peacetimes for ordinary marine risk. War risk insurance is a separate factor, not pertinent to this discussion.

Assuming that the emery wheel of experience has demonstrated probabilities, it is believed unlikely that the ocean freight and insurance rates on rubber can be expected to average less than ½c per pound in future periods of peace and that they should not average in excess of ⅝c, on the basis of U. S. currency before devaluation.

#### Taxes on Rubber Imports

Natural rubber as a raw material needed by every modern civilization has customarily entered most countries free of import duty. Furthermore the desire of rubber manufacturing countries to provide employment for labor in producing finished rubber goods at low enough prices to compete in international trade in rubber products is another factor.

Noteworthy exceptions to this general rule have occurred in recent years. Three examples of this suffice for purposes of this study.

The world trade depression of 1929-1933 entailed severe hardship for producers of rubber. French Indo-China then had a production considerably less than 20,000 tons. France, the mother country, was importing about 50,000 tons of rubber annually from all sources. In 1931, France imposed an import duty of 30 centimes per kilogram on imports of rubber and the rubber content of finished products. This revenue was employed in a Compensation Fund from which a subsidy in the form of premiums up to a maximum of three francs per kilogram of rubber exported was given to rubber producers in Indo-China. The premium actually paid in 1931 was 2.09 francs per kilogram in the second quarter, 2.85 francs in the third quarter, and 3.00 francs in the fourth quarter. This relief continued throughout the depression and kept the plantation industry in Indo-China on a sound financial basis. The cost of production data already supplied on Indo-China shows that this did not prevent that country from lowering its all-in costs below those of other countries in subsequent years.

Germany, in order to raise money for financing its program for the production of synthetic rubber, made effective an import duty on crude rubber, gutta percha, and balata on May 13, 1937. One effect of this was to preclude German competition in internatonal trade in finished rubber goods except under barter arrangements or by subsidization.

Brazil, in order to stimulate domestic use of rubber produced in the country, has had restrictive regulations on imports of natural rubber, reclaimed rubber, and synthetic rubber.

The diverse tendencies indicated by these examples of import duties had one thing in common—all were nationalistic or isolationist in principle.

## Conclusions

The writer's opinions, based on the foregoing review and previous rubber research experience, are that in the 1935-1938 period of Rubber Regulation:

#### I. Items Entering Into Price of Rubber

The items aggregated in the prices paid by manufacturers who have bought Far East rubber f.o.b. cars New York may be grouped as follows:

(A) Operating costs and profits of New York dealers.

(B) Overseas freight and insurance.

(C) Charges, costs and profits of rubber producers.

(1) Profits, before income or profits taxes.
(2) Home office administration and directors' fees.
(3) Staff bonuses; commissions on purchases and sales.
(4) Amortization of estate; or replanting costs.
(5) Depreciation of buildings and machinery.
(6) Export taxes on rubber.
(7) Other costs f.o.b. Eastern port, including:
(a) Local taxes, except export taxes.
(b) Local transportation.
(c) Supplies and materials.
(d) Staff and labor, including research.
(e) Other services and miscellaneous costs.

#### II. Stable Unit of Value Desirable

It is desirable that costs be expressed in terms of a stable value. United States currency, since the dollar was devalued in 1933-34, has had a stable gold value of 59c and is used for purposes of presenting conclusions based on present currency.

However, in order to facilitate comparisons with background data in the documentation for years prior to 1933, conclusions are also stated in terms of the dollar *before* devaluation, the term "gold basis" in parentheses being used to designate this value in paragraphs V and VII of these conclusions. This will serve to clarify the conclusions for future use in case the dollar should hereafter undergo variations.

Use of American currency unavoidably conceals the internal price effects of devaluation of Dutch currency during the period on which conclusions are based. The effects of devaluation are to increase at least temporarily the competitive strength of rubber producers of the country, internationally, while a considerable period of time may elapse before this is reflected domestically in rising costs.

#### III. New York Dealers' Charges

The selling prices of New York dealers cover, in addition to c.i.f. costs of the rubber itself:

(1) Profits, before income or profits taxes.

(2) Office, buying and selling expenses.

(3) Finance and credit charges.
(4) Warehouse and insurance charges.
(5) Entry, weighing, and drayage charges.

Estimates of the cost of these dealers' services are peculiarly difficult because dealers engaged in business beyond the borders of these items and derived considerable income from transactions on the Rubber Exchange and elsewhere.

A reasonable amount for charges in this connection is believed to be about 2/3c a pound of rubber for the 1935-38 period.

### IV. Groups of Producers in Order of Costs

The following order of arrangement shows, for *groups* of producers of plantation rubber, the approximate order of average all-in production costs per pound of rubber toward the close of the 1935-1938 period, indicated by the evidence.

| | |
|---|---|
| HIGH | Ceylon Sterling Companies |
| | Malayan Sterling Companies |
| | Dutch Estates |
| | Malayan Dollar Companies |
| | Ceylon Rupee Companies |
| | Indo-China Estates |
| | Ceylon Smallholders |
| | Malayan Smallholders |
| LOW | Dutch Natives |

The groups are constituted of producers with different forms of organization, different trade practices, different standards of living, different types and qualities of product.

The order of arrangement does not necessarily imply relative efficiency, but does indicate that data heretofore provided on costs of Malayan and Dutch estates are high enough to cover all other classes of producers of plantation rubber.

All-in costs of individual producers in any group range likewise from high to low.

It is convenient to state at this point that conclusions are based on comprehensive consideration of all these classes of producers, with all the varying types and qualities of rubber which they produce taken as a composite.

### V. Percentages of Production at Various All-in Costs

Accompanying Chart 2 portrays the approximate percentages of total rubber production from planted areas in the Far East that were produced at various all-in costs of production in 1935-1938, in terms of U. S. currency (at the foot of the chart), as well as in terms of the gold basis equivalent (at the top of the chart).

The curve represents the range of all-in costs per pound of rubber c.i.f. New York, not including producers' profits. This range is not the equivalent of c.i.f. prices, but is intended to cover the real overall costs per pound of rubber for all the producers listed in IV.

In preparation of this chart, the cost of special export taxes on Dutch native rubber in 1935-1936 was eliminated and the Dutch native rubber c.i.f. cost considered free of that tax which was discontinued in 1937. This enables the ability of these producers to deliver rubber at low cost to be reflected in the chart.

The chart indicates that a small percentage of rubber reached New York at a cost (aside from the special tax on Dutch native rubber) of 5.1c (3c gold basis) per pound, that approximately 30% of the total had a c.i.f. cost under 8.5c (5c gold basis), and slightly over 50% under 10.2c (6c gold basis). This covers the production of the low-cost producers. It is indicated that 90% of the total had a c.i.f. cost under 13.6c (8c gold basis) and that at still higher costs only a small and rapidly diminishing percentage of the output was forthcoming. In general, the estates would fall in the range from 8.5c upward, the natives in the range from 10.2c downward.

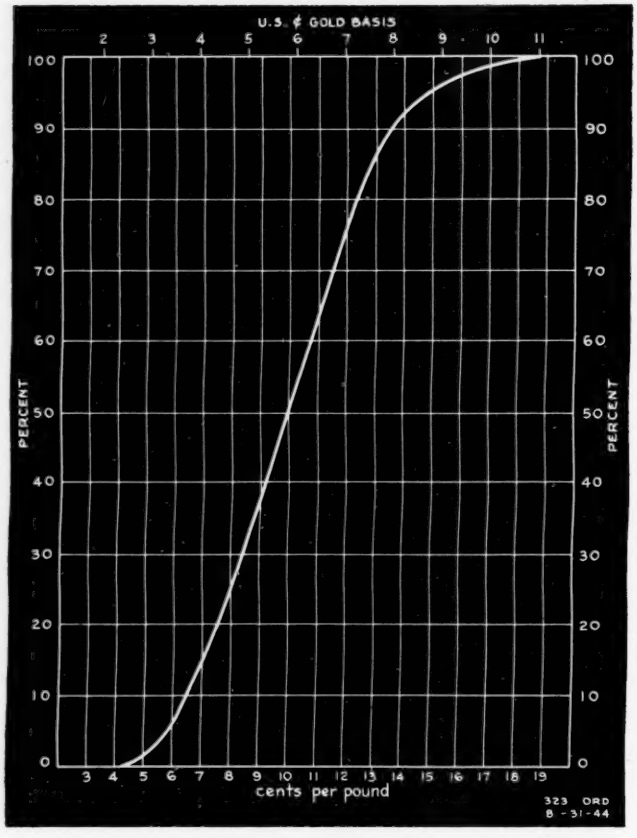


**Chart 2. Cumulated Percentages of Production of All in Costs for Plantation Rubber Estimated for Period 1935-1938, C.I.F. New York**

It should be borne in mind that the costs represent the real costs, including items C-2 to C-7 inclusive (see I above) so far as the practice of the various groups of producers called for such expenses, under their forms of organization and practices.

It should be further noted that these costs are estimated for a four-year period during which the permissible export rate averaged 67 3/16%, and that theoretically, at a 15% higher average rate of permissible exports, the costs would have been perhaps 1c (0.59c gold basis) lower for the large estates, as the overhead expenses would have been spread over increased output.

The overall averaged c.i.f. cost of production for all qualities and types of plantation rubber in the period 1935-1938, based on this chart, was about 10c (5.9c gold basis) per pound.

### VI. Ocean Freight and Insurance

During 1935-1938, the ocean freight and insurance ranged from ½c to ¾c U. S. currency per pound. These costs are included in Chart 2.

### VII. Variations in F.O.B. Costs Far East Ports

Referring to I, above, some producers had no costs under items C-2, C-3, C-4, and C-5; while others had costs under some, but not all of these items.

Under C-7, a Dutch native would have little expense aside from his own labor and, as indicated in the compendium, his "costs" would be the price for which he was willing to sell the rubber he produced under circumstances prevailing at the time. This "cost" has at times been extremely low.

On the other hand, there are some Malayan dollar and Ceylon rupee companies, for example, which with almost insignificant expense under C-2 to C-5, have so high costs under C-7 that they are barely competitive in all-in costs with high-yield sterling companies which have charges under all these items.

The point to this is that f.o.b. costs at Far East ports have less relation to the over-all competitive strength of a particular producer than is sometimes supposed. The important thing is whether the New York c.i.f. costs of the rubber he produces are competitive, in its particular quality. At 13.6c (8c gold basis) per pound c.i.f. New York, a particular high-cost producer might have nearly all his expense, other than export tax and over-seas freight and insurance, in the items listed under C-7, and yet his aggregate cost might be so great as to leave him little profit.

For these reasons the percentage of total production produced at various ranges of f.o.b. cost Far East port cannot

be stated with definiteness from available data.

At the low end, production of some Dutch native rubber would continue at 3.4c (2c gold basis) per pound, and there are some of the most efficient estates that could deliver their rubber at the same f.o.b. cost level, covering expense items listed under C-7.

At the other end of the scale some competitive and therefore efficient producers would have very high f.o.b. costs.

On the large estates it is believed that the great bulk of the production had an f.o.b. cost, including items under C-7, ranging from 3.4c to 7.65c (2c to 4½c gold basis) per pound of rubber.

**VIII. Long-Term Lower Costs from High-Yield Estates**

The long-term trend of production costs, on a gold basis, was still downward at the outbreak of World War II, and lower costs would have resulted from conversion of estates to a high-yield basis.

**IX. Temporarily Wider Range of Post-War Costs Expected**

When Malaya and the Netherlands Indies are reoccupied, the writer believes, it will be at least two years before average cost of rubber production on estates in those countries can regain former low levels, under the best circumstances, even if the trees are undamaged. They will have unusual expenses and problems of reequipment, reorganization, staff procurement and training, to increase their costs in the immediate postwar years. The costs of native producers in the Netherlands Indies will be little influenced by the war, and in Malaya their costs will be less affected than costs on the estates. Estate costs in Ceylon and Indo-China will be less affected than in Malaya and the Netherlands Indies. There will, therefore, for a period of years after enemy-occupied regions again are accessible, be a wider range of average costs for different groups of producers than in 1935-1938.

**X. Producers Capable of Short-Term Reduced Costs**

The ability of producers of natural rubber to supply rubber to the United States, for a temporary period, at costs lower than those discussed above, was demonstrated in 1931-1933. However, even the one-year record low 3½c average New York price and average U. S. import value for rubber in 1932 would mean nearly 6c per pound in terms of present United States currency, and that price would not assure continuation of rubber estates in existence over a long period of years. While considerable native production would continue at such a price, it is probable that deterioration of properties would result in a few years, and certainly development of modern high-yield estates would be precluded. This study provides ample evidence that plantation rubber production costs are dynamic, and capable of downward adjustment to meet price conditions when demand is low. Output of natural rubber has been curtailed by low prices only when they failed to cover basic costs which were far less than total costs.

**XI. Taxation Costs**

Taxation has had an important bearing on all-in costs of rubber in past years. Allowable cost items, under taxes, have been taken to include items C-6 and C-7a (see I above), but not taxes on corporation income or profits, nor the special tax on exports of Dutch native rubber.

**XII. Exchange Rates**

The postwar price of natural rubber will probably be influenced by any important variations in postwar exchange rates for the British pound and the Dutch guilder in relation to American currency. Presumably the United States price for rubber would be lower, at least temporarily, with the British pound at $3 than if it were stabilized at par ($4.86), for example. The price effect of variations in exchange rates on imported natural rubber might be considerable for a short time, while the effect of variations on the cost of domestic synthetic rubber production, in terms of U. S. currency, would perhaps be small for a period of years.

RUBBER RESERVE CO. ESTIMATED COST AND SALES REALIZATION, JULY, 1940, THROUGH JUNE 30, 1944

| | Production and Purchases | | Sales | | Sales Realization* |
|---|---|---|---|---|---|
| | Quantity | c/Lb. | Quantity | c/Lb. | c/Lb. |
| GR-S (Buna S) | 497,312 | 35.2 | 471,965 | 22.0 | 26.2 |
| GR-M (Neoprene) | 50,119 | 26.7 | 47,890 | 32.2 | 39.9 |
| GR-I (Butyl) | 8,360 | 35.6 | 3,974 | 15.7 | 18.9 |
| GR-P ("Thiokol") | 751 | 42.0 | 51 | 21.9 | 21.9 |
| Total synthetic (long tons) | 556,542 | 34.4 | 523,880 | 22.9 | 27.4 |
| Natural rubber (long tons) (exclusive of purchase and sales from Central and South America) | 828,561 | 21.4 | 745,638 | 22.0 | 24.9 |
| Natural rubber (long tons) (including purchases and sales from Central and South America) | 882,218 | 25.6 | 789,020 | 21.9 | 25.1 |

* The War and Navy Departments, the Maritime Commission, and the Treasury Procurement pay Rubber Reserve Co. 17½c per pound on the synthetic rubber and natural rubber reported to have been used in articles manufactured for war orders.

THE SECRETARY OF COMMERCE
WASHINGTON

August 30, 1944

Dear Mr. Dewey:

In compliance with your request, I enclose a memorandum, showing

(a) the amount of synthetic rubber that we have manufactured up to June 30, 1944, the amount sold, the approximate cost per pound, exclusive of plant amortization, and the amount per pound realized from sales

(b) the amount of natural rubber bought in our stockpile program from July, 1940, through June, 1944, the approximate cost per pound, the amount sold, and the approximate realization per pound.

The memorandum reflects our natural rubber purchases and sales, both exclusive and inclusive of the Central and South American procurement and development program.

Sincerely yours,
JESSE JONES
Secretary of Commerce

Mr. Bradley Dewey
Rubber Director
War Production Board
Washington, D.C.

## Rubber Division Director

Benjamin Garvey, in charge of process and product control of synthetic rubber production for The B. F. Goodrich Co., Akron, O., was recently elected a director of the Division of Rubber Chemistry of the American Chemical Society. Dr. Garvey, who has been active in rubber research and development for the past 17 years, has conducted research on rubber chemicals, Koroseal, chemical reactions of rubber, the chemistry of vulcanization, synthetic rubber, and other polymers, and the compounding of both natural and synthetic rubber. He has published in various scientific journals more than 20 articles describing the methods and results of his experimental work, and 12 patents covering accelerators, polymers, and processes for the manufacturing and compounding of synthetic rubber have been issued to protect his discoveries.

B. S. Garvey, Jr.

The first two years of his life were spent in Cambridge, Mass., where Benjamin St. John Garvey was born February 1, 1900. His elementary education was gained in several schools including Racine College School, Racine, Wis., and Hyde Park High School, Chicago, Ill. He received the B.S. degree in 1921 and the M.S. in 1925 from the University of Illinois, Urbana, Ill. An M.A. degree in 1926 and a Ph.D. in 1927 were earned at Harvard University, Cambridge, Mass.

In 1921, Dr. Garvey entered the teaching profession as instructor of chemistry at Boone University, Wuchang, China, an Episcopal missionary college. During his three years in China he found time to travel extensively in that country and gained a good knowledge of the language, the customs, and the culture of the people.

In 1927 Dr. Garvey began his work with Goodrich in its general laboratory. Work on brass plating and accelerators was followed by research on compounding

(*Continued on page* 459)

# Specification for GR-S[1]

## Supplement on GR-S for Wire and Cable Use

THIS supplement to the Specification for GR-S shall be applicable to GR-S for wire and cable use. GR-S for this purpose shall meet the following requirements in addition to those set forth in the Specification for GR-S:

**Specification Limits**

**II. Chemical**

F. Water soluble ash—0.45% maximum

**III. Physical**

D. Plasticity-Recovery at 70° C.
Plasticity at 10 minutes (P-10)—5.5 mm. maximum
Recovery at 10 minutes (R-10)—8.0 mm. maximum

E. Water absorption—20 hrs. at 70° C.—5.5 mg./sq. cm. maximum

### Method of Analysis

**I. Chemical**

F. WATER SOLUBLE ASH. Add to the crucible[2] containing the ash (Section I-E under Method of Analysis on page 5 of the Specification for GR-S) 30-milliliters of hot distilled water (80 to 90° C.) and allow it to stand for five minutes without stirring. Filter the solution with suction, and repeat the digestion with two additional 30-milliliter portions of hot distilled water. Transfer the combined filtrates to a tared, lightweight evaporating dish which has been heated to a constant weight of 105° C. Evaporate the filtrate to dryness, and heat the residue in an oven at 105° C. to constant weight (approximately one hour). Cool the evaporating dish plus the residue to room temperature in a desiccator and weigh them.

CALCULATION

$$\text{Water soluble ash, } \% = \frac{100\ (B-C)}{A}$$

A = the weight of the original dry sample used for the ash determination.
B = the weight of the evaporating dish plus the residue.
C = the weight of the evaporating dish.

**II. Physical**

D. PLASTICITY-RECOVERY. Mill approximately 400 grams of the sample remaining from the volatile matter determination (Section I-A under Method of Analysis on page 3 of the Specification for GR-S) for exactly 15 minutes. Use a laboratory mill meeting the specification given in Section II-B-2-a under Method of Analysis in the Specification for GR-S, having a roll temperature between 110° and 130° F. and having a distance between the rolls of 0.055 plus or minus 0.005-inch as determined by a lead slug. Make ¾ cuts from alternate sides each half minute throughout the milling. At the end of 15 minutes remove the sample quickly from the mill and place it on a clean surface (Holland cloth or cellophane) to cool. Cut several disks from the sheet, using a circular die 29/32-inch in diameter. Ply sufficient disks to form a four-cubic centimeter pellet (3.75 grams for a sp. gr. of 0.94), being careful to exclude air between the plies. Save the remainder of the sheet for the water absorption determination under Section E below.

Preheat the four-cubic centimeter test pellet in an oven at 70 plus or minus 1° C. for exactly ten minutes. Then place the pellet, with protecting sheets of a hard finish paper (Bulkeley-Dunton & Co., English Finish Grade B Paper; Stevens Paper Mills, hard Kraft condenser paper; or equivalent) on the top and bottom surfaces, between the platens of a Williams parallel plate plastometer.[3] Lower the upper platen and read the gage after exactly ten minutes to the nearest 0.1 millimeter. Remove the pellet from the plastometer, but leave it in the oven as 70° C. Measure the thickness of the pellet, without removing the paper, to the nearest 0.1 millimeter, exactly ten minutes after removing it from the plastometer, using a Randall-Stickney thickness gage equipped with a one-inch diameter foot and so loaded that the total applied weight including the foot is three ounces.

CALCULATION

Plasticity, mm = A — C.
Recovery, mm. = B — C.

A = the plastometer gage reading at 10 minutes.
B = the Randall-Stickney gage reading at 10 minutes.
C = the thickness of the hard-finish paper sheets used to prevent the pellets from adhering to the platens of the plastometer.

E. WATER ABSORPTION. Refine the remainder of the sample from the plasticity-recovery determination (Section D above) by passing it twice through a laboratory mill having a distance between the rolls of 0.008 plus or minus 0.002-inch as determined by a lead slug. Then sheet the sample to a thickness of approximately 0.070-inch. Mold a sheet between aluminum or tinfoil at 292° F. for ten minutes in the mold specified in Section II-B-3-2-(1). After cooling the sheet, cut test pieces from it in duplicate with a steel die two by five inches in dimensions. Remove the protective foil and place the test pieces on a grounded copper screen for five minutes to remove any static charge. Immerse the test pieces into freshly distilled water; remove them immediately, and absorb the surface moisture by pressing the pieces lightly between lintless filter papers. Weight the test pieces accurately. Place them into a beaker of distilled water which is maintained at 70 plus or minus 0.5° C. and allow them to remain for twenty hours. Use an aluminum wire-mesh holder or separator to keep the test pieces from touching each other. After twenty hours remove the test pieces; place them into distilled water at room temperature for ten minutes; remove them, and absorb the excess surface water by pressing them lightly between lintless filter paper. Weigh the test pieces immediately so that no moisture is lost.

CALCULATION

$$\text{Water absorption, mg./sq. cm.} = \frac{C-B}{A}$$

A = the area of the original test piece in square centimeters.
B = the weight of the original test piece.
C = the weight of the test piece after immersion for 20 hours.

This supplement is issued by Rubber Reserve Co., Washington 25, D. C., upon the request and with the approval of the Committee on Specifications for Synthetic Rubbers.

Approved October 10, 1944.
Effective November 1, 1944.

[1] For most recent and complete "Specification for GR-S" see INDIA RUBBER WORLD, July, 1944, pp. 418-20.

[2] It is suggested that a fine porosity fitted glass filtering crucible be used for the ash determination in the Specification for GR-S. In order to reduce the breakage of fritted crucibles, they should be allowed to cool gradually to at least 300° C. in the muffle furnace before they are removed to the desiccator for final cooling. When fritted crucibles are used, it is recommended that a small ashless filter paper be placed in the bottom of the crucible in order to prevent the loss of liquid pyrolysis products.

[3] "The du Pont Modified Williams Plastometer," INDIA RUBBER WORLD, May, 1944, pp. 174-175, 181.

### Rubber Reserve Co. Circulars

NEW procedure for the distribution of experimental-type synthetic rubbers produced in Rubber Reserve Co. plants is described in Rubber Reserve Circular No. 34, effective December 1, 1944. The Research & Development Section, Rubber Reserve Co., will make available to synthetic rubber consumers general information on the properties of new experimental rubbers.

Twenty bales of each original plant run of such rubbers will be reserved for general distribution. Requests for amounts not exceeding two bales (about 150 pounds) will be filled in the order received. Orders will be filled upon the condition that the purchaser furnish Rubber Reserve with a report summarizing the purchaser's experimental work on the particular synthetic delivered. Purchase requests should be made in accordance with procedure given in Rubber Reserve Circular No. 27.[1] Additional production of an experimental rubber will be made if the number of requests warrant. Prices will be the same as those for standard GR-S.

Circular No. 35 details new procedure for the preparation of purchase requests for GR-A (Buna N), effective for January deliveries and thereafter. Attention is called to the permitted uses of GR-A as given in the amended Rubber Order R-1. Experimentation need not be confined to permitted uses. For experimental purposes 200 pounds may be consumed in any one month.

[1] INDIA RUBBER WORLD, June, 1944, p. 316.

**"Softeners for GR-S" Reprints Available**

**In response to numerous requests, we have prepared rotoprints of the article "Softeners for GR-S" by B. S. Garvey, Jr., and his coworkers, which appeared in the October and the November, 1944, INDIA RUBBER WORLD. Copies may be obtained from 386 Fourth Ave., New by 50c for each copy, is forwarded York 16, N. Y., if the request, accompanied promptly.**

# EDITORIALS

## The Challenge of 1945

THERE seems to be little reason to doubt that the outlook for the year 1945 is for a continuation of our war effort at an even higher level than during 1944, and this presents a challenge to better the performance record of the year that has just ended. The optimism which followed the successful invasion of France and the break-through to the borders of Germany has been replaced during the past few weeks by a sober realization that the war in Europe and in Asia is far from won and that it cannot be won merely as a result of the war production efforts up to the present time.

At the annual meeting of the National Association of Manufacturers in New York in December, F. C. Crawford, chairman of this Association, who with five other industrialists had just returned from a visit to our front lines on the borders of Germany, reported that one war now has ended in Europe and a new one has begun—a "terrible new slugging war" against a revitalized enemy, and that every American on the home front must reenlist to help win it. Difficult terrain and the surprisingly good enemy strength, morale, equipment, and resourcefulness found on this front only served to emphasize that an even greater production of war material on our home front will be necessary during 1945.

It is in this need of greater production of war material, particularly the need of more truck, bus, and jeep tires, that the greatest challenge to the rubber industry for the year 1945 is found. During 1944 about 15,000,000 of these tires were produced, but in 1945, 20,000,000 from facilities now built or soon to be completed are not enough, and the construction of new plants to produce an additional 4,000,000 tires a year has now been decided upon by the War Production Board. Obviously new plants will not provide more tires unless manpower of the right type can be found to staff them. More than 10,000 new workers will be needed for all these new facilities, but results to date in labor recruiting by the War Manpower Commission, intensified since the Summer of 1944 to satisfy the requirements of the tire industry, have not been too successful.

The Army has indicated that it will furlough for 90 days, 1,200 men with experience in tire building, but this is only a small part of the skilled manpower that the industry has lost to the Armed Services since the war began. The manpower for the new tire production facilities must be found; labor officials say that it is available; government officials seem to have trouble finding it, but the fact remains that it will be up to the industry to find the necessary men or transfer them from other work. Since most of these workers will have little or no experience in tire work, a training program will be required. In order to be certain of retaining the men when their training has been completed and they are ready for the production line, adequate wages and living conditions, particularly during the training period, will have to be provided. The fact that the industry will have ample jobs for trained tire workers during the postwar period should also be strongly emphasized.

In general it may be said that as far as the question of material and equipment for all-out war production in 1945 is concerned, the rubber industry is reasonably well situated. Natural rubber is, of course, in short supply, and although ample synthetic rubber is available, there still remains the challenge to develop a synthetic rubber easier to process and more durable under high and low temperature service conditions. Some mention has been made of new synthetic rubbers better than GR-S for the production of tires, but whether volume production of any of these rubbers could be arranged for and whether their use in place of GR-S would increase tire production are not known. The extreme urgency of the military tire demand certainly requires a critical review of such possibilities.

Finally, an excellent summation of the outlook for 1945 as well as for future years is found in a talk given by Harvey S. Firestone, Jr., before the Economic Club of New York on December 5 on the subject of "The Outlook for Postwar Industry." In concluding this talk he said:

"The problems of the future will challenge all of the ingenuity of American industry. But since when have we been afraid of a challenge? Are we going to pass the buck by dumping our troubles into the lap of government, or shall we recognize and anticipate the dangers ahead and plan now to meet them?"

Let's be sure that we more than meet the challenge of 1945.

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## A "Selective" Military Service

IT IS probable that when the new Congress convenes this month, a bill proposing universal military service of at least one year for all young men upon reaching their eighteenth birthday will be offered for consideration as a national policy for future peacetime years. Public opinion, according to present indications, is about 70% in favor of such a policy.

If such a bill does become a law, every effort should be made by leaders in industry, science, and engineering to make certain that it will be a "selective" rather than a "universal" military service law. Scientific and technical manpower has not been too wisely used in the present war, and the indiscriminate drafting of this manpower not only during future periods of actual warfare, but also during periods of peace, should be prevented in order that our country may retain its leadership in scientific and technical fields

# Scientific and Technical Activities

## A.S.M.E. Rubber and Plastics Division Meeting Well Attended

THE meeting of the Rubber and Plastics Division of the American Society of Mechanical Engineers, held as part of the annual meeting of the parent society at the Hotel Pennsylvania, New York, N. Y., the week of November 27, attracted an attendance of more than a hundred representatives of rubber and plastics manufacturers and users. The all-day session of the Division, on November 30, featured the presentation of three papers on plastics and plastic compositions, and their properties and uses during the morning session under the chairmanship of H. M. Richardson; while the afternoon session heard four papers on rubber. E. F. Riesing was chairman of the rubber session.

The first paper at the morning session was entitled "Creep Properties of Molded Phenolic Plastics at Elevated Temperatures." The authors were W. J. Gailus and David Telfair, of Monsanto Chemical Co. An abstract of this paper states that this work was intended to complement and expand the investigation formerly reported by Telfair on the creep of phenolics and gives a more definite interpretation of the behavior of phenolics at high temperatures. Seven types of materials (wood flour, rag, tire cord, asbestos, and mica filled resins; unfilled resin; and paper laminate) were tested at 192° F. Tension creep data up to 1000 hours are reported, with recovery data up to 250 hours. Data on Young's modulus at the beginning and the end of the 1,000 hour tests were obtained. The effect of moisture on the creep properties of these materials is shown, and the relation between creep rate and stress for these materials is analyzed. A relatively large amount of shrink is observed to take place in these materials, especially in those with cellulose fillers.

The second paper, "Effect of Some Environmental Conditions on the Permanence of Cellulose Acetate and Cellulose Nitrate Sheet Plastics," reported the work of T. S. Lawton, Jr., and H. K. Nason, also of Monsanto. The authors in an abstract report that the effect of outdoor exposure, both in Florida and in Massachusetts, on the tensile properties, impact strength, optical properties, and shrinkage of cellulose acetate and cellulose nitrate sheet plastics is shown in detail, and the general nature of these effects is summarized. The effect of outdoor exposure on the composition of these plastics and on the molecular weight of the base cellulose esters is shown quantitatively. Moisture pick-up and dimensional change upon immersion in water are reported.

Development of a new laminated paper plastic, called "papreg," which has been found situable for non-structural aircraft parts and other commercial uses, was described by E. C. O. Erickson and George E. Mackin, of the Forest Products Laboratory of the Department of Agriculture, in the final paper of the morning session. "Papreg" has a specific gravity of about 1.4 at a resin content of about 35%. It has a smooth, hard surface and reasonable decay and moisture resistance. It lends itself to low-pressure molding techniques, and has been satisfactorily postformed to

E. F. Riesing

moderate double curvature, according to the authors. In the lengthwise direction the parallel-laminated "papreg" has tensile and flexural strengths of 36,000 pounds per square inch and in the crosswise direction strengths of 20,000 and 24,000 pounds per square inch for tension and flexure. The strength properties of "papreg" increase with decrease in temperature, but show a general decrease with increasing temperature. Papreg shows a 10 to 15% increase in moisture content on long-time exposure to high humidity or to immersion. One phase of the development work concerned the possibility of employing low molding pressures, and encouraging results were obtained with pressures as low as 50 pounds per square inch, it was also reported.

### Papers on Rubber

The first paper presented at the afternoon session was on "Creep and Relaxation in Rubber Products" by R. D. Andrews and A. V. Tobolsky, of Princeton University. In brief, the authors reported that theoretical and experimental studies of the relaxation of stress in rubber samples held continuously or intermittently at a constant elongation, and the creep of similar samples supporting a constant load have furnished interesting and valuable information about the deteriorative changes taking place in natural and synthetic rubbers at high temperatures. It has been found that two chemical reactions take place simultaneously in both natural and synthetic rubbers at high temperatures; one is a cutting of the chain molecules in the rubber network, and the other is a cross-linking of the molecules which produces new network chains. These two reactions are responsible for both the relaxation and creep of rubbers at high temperatures, and relaxation and creep have been related theoretically on this basis. Creep and relaxation can be used as experimental methods for measuring the rates of the two reactions. Both reactions occur in the presence of oxygen, although a very small amount is necessary; both reactions can be greatly slowed down by a careful exclusion of oxygen.

The time required for failure of rubber in service by relaxation or creep will depend greatly on whether the rubber is subjected to continuous or only to intermittent deformation. Failure will occur more rapidly under continuous deformation since failure under those circumstances depends primarily on the cutting reaction; in intermittent deformation failure is due to the net effect of both reactions, and the two reactions neutralize each other to a certain extent since each reaction undoes the work of the other.

The next paper, "Use and Evaluation of Some Specialty Adhesives," was given by Fred J. Wehmer, of Minnesota Mining & Mfg. Co. The uses to which adhesives are put are almost beyond enumeration, Mr. Wehmer said and added that the war has put an emphasis on replacement materials; as a result, many new resins and other materials are being used as adhesives. The field of structural adhesives, varying from the vulcanizing adhesives used to fasten rubber and synthetic rubber to metals, to adhesives for plywood and adhesives for lamination of metal parts, is growing rapidly, and the speaker said that he felt that future developments would be many and outstanding.

Reference was made to adhesives made from latex or water dispersed resins, reclaims, and the glues and starches, which find a large usage in combining paper and cloth. Resin-synthetic rubber combinations have been used for some unique installations, such as on aircraft and ships, to provide a surface on which the personnel can walk without danger of slipping, and these adhesives must have good application characteristics, plus ability to withstand water, and a wide range of temperatures. Mention was also made of the use of adhesives for lining chemical equipment. Through the use of adhesives in combination with compounds designed for application over these adhesives, it is now possible to line tanks in the field, which has certain advantages over the fabrication of complete structures in the factory, Mr. Wehmer pointed out.

The two final papers on this program were the yearly surveys on rubber and plastics which have become one of the features of the Division at the annual meeting. "Advances in Rubber during 1944" was presented by J. W. Liska, of Firestone Tire & Rubber Co., and "Advances in Plastics during 1944" was presented by G. M. Kline, of the National Bureau of Standards. Both of these papers will be published in a future issue of INDIA RUBBER WORLD.

### The Executive Committee Meeting

At a meeting of the executive committee Dr. Kline, the retiring chairman, stated that the Division is in an excellent condition to enlarge its activities. Dr. Kline is succeeded by E. F. Riesing, chief automotive engineer of Firestone Industrial Products Co., Detroit, Mich., as chairman of the Division for 1945. A procedure for providing alternation of industry repre-

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sentation between rubber and plastics in the office of chairman of the Division, as suggested by Mr. Riesing, was adopted. The cycle will be a rubber manufacturer's representative will be chairman for one year, followed by a representative from a rubber and plastics user, and the third year's chairman will be a representative of one of the plastic manufacturers.

It was decided to have one morning and one afternoon session of the Division at the semi-annual meeting of the A.S. M.E. scheduled to be held in Chicago in June. A series of outstanding papers in the rubber and plastics fields is being arranged.

Members of the executive committee for 1945 are: chairman, Mr. Riesing; secretary, James H. Booth, Thompson Products; senior member, H. M. Richardson, De Bell & Richardson; E. G. Kimmich, Goodyear Tire & Rubber Co.; and J. F. Downie Smith, United Shoe Machinery Corp. A new advisory committee to act in a consultatory capacity to the executive committee was appointed, including John Delmonte, Plastics Industry Technical Institute; Dr. Kline; F. L. Yerzley, Western Electric Co.; L. E. Jermy, *Machine Design;* and R. G. Seaman, INDIA RUBBER WORLD.

## Dewey Will Head A.C.S.

BRADLEY DEWEY, president of Dewey & Almy Chemical Co., Cambridge, Mass., and former Rubber Director, has been elected president of the American Chemical Society for 1946. Serving as president during 1945 is Carl Shipp Marvel, professor of organic chemistry at the University of Illinois, who succeeds the late Thomas Midgley, Jr., and will in turn be succeeded next year by Colonel Dewey.

## Detroit Group Party

FORCED by a labor dispute to dispense with the scheduled dinner, the Detroit Rubber & Plastic Group's annual Christmas party took the form of a smoker at the Detroit Leland Hotel, Detroit, Mich., December 8. About 225 members and guests attended, including many visitors from out of town.

Major W. S. Rigby, Ordnance Intelligence Officer of the Office of the Chief of Ordnance, United States Army, the featured speaker, discussed enemy combat and transport vehicles. Lack of automotive dependability was cited as the chief weakness of the German army; Japanese equipment was termed "simple, but workable." A captured German film showing the manufacture and operation of the German medium tank was shown by Major Rigby.

Entertainment was supplied by Walter Grote, of Wilmington Chemical Corp., with a sleight-of-hand performance.

Newly elected officers for 1945 were announced. They are: chairman, J. C. Dudley, Chrysler Corp.; vice chairman, J. R. Shroyer, R. T. Vanderbilt Co., Inc.; and secretary, E. Kvet, Baldwin Rubber Co.

About 100 door prizes were distributed. They were contributed by the following companies:

Xylos Rubber Co.; Baldwin Rubber Co.; Hycar Chemical Co.; New Jersey Zinc Co.; Stamford Rubber Supply Co.; Godfrey L. Cabot, Inc.; INDIA RUBBER WORLD; *Rubber Age;* Moore & Munger; Pequanoc Rubber Co.; A. Schulman, Inc.; Advance Solvents & Chem. Corp.; U. S. Rubber Reclaiming Co., Inc.; Binney & Smith Co.; Dow Chemical Co.; J. M. Huber, Inc.; Witco Chemical Co.; Carter Bell Mfg. Co.; Thiokol Corp.; Industrial Rubber Goods Co.; Sharples Chemicals, Inc.; E. I. du Pont de Nemours & Co., Inc.; F. F. Myers Co.; Minnesota Mining & Mfg. Co.; Barrett Division, Allied Chemical & Dye Corp.; Hercules Powder Co., Inc.; Naugatuck Chemical Division, United States Rubber Co.; Stanco Distributors, Inc.; Phillips Petroleum Co.; Neville Co.; C. K. Williams & Co.; General Tire & Rubber Co.; American Cyanamid & Chemical Corp.; H. Muehlstein & Co., Inc.; Flintkote Co.; Henry L. Scott Co.; Biggers, Rohm, Haas; American Zinc Sales Co.; Herron Bros. & Meyer; Monsanto Chemical Co.; Wilmington Chemical Corp.; Philadelphia Rubber Works Co.; C. P. Hall Co.; Whittaker, Clark & Daniels, Inc.; Central Rubber and Steel Corp.; Standard Chemical Co.; Sun Oil Co.; R. T. Vanderbilt Co., Inc.; General Magnesite & Magnesia Co.; Piqua Stone Products Co.; Corduroy Rubber Co.; Givaudan-Delawanna, Inc.; and Firestone Tire & Rubber Co.

## N. Y. Group Christmas Party

THE New York Rubber Group 1944 Christmas party was held December 15 at the Building Trades Club, 2 Park Ave., New York, N. Y. More than 400 members attended. A cocktail hour and dinner were followed by variety entertainment.

Officers for 1945 include: chairman, H. E. Outcault, St. Joseph Lead Co.; vice chairman, George J. Wyrough, Whitehead Bros. Rubber Co.; secretary-treasurer, B. B. Wilson, INDIA RUBBER WORLD; sergeant at arms, C. A. Meyer, Barrett Division, Allied Chemical & Dye Corp. The executive committee are: (one-year term) D. A. Comes, Farrel-Birmingham Co., Inc., W. B. Dunlap, Jr., Lee Rubber & Tire Corp., A. M. Eufer, R. T. Vanderbilt Co., Inc.; (two-year term) H. L. Fisher, U. S. Industrial Chemicals, Inc., H. Frecker, United States Rubber Co., S. M. Martin, Jr., Thiokol Corp.; and (three-year term) P. P. Murawski, E. I. du Pont de Nemours & Co., Inc., J. E. Waters, General Cable Corp., and A. P. Stubbs, Manhattan Rubber Mfg. Division, Raybestos-Manhattan, Inc. Ex-officio members of the executive committee are F. S. Conover, Naugatuck Chemical Division, U. S. Rubber Co., and P. P. Pinto, *The Rubber Age.* It was announced that the Group now has 688 paid members, an increase of 130 over 1943.

Distribution of 89 valuable prizes was made possible by the contributions of the following:

Advance Solvents & Chemical Corp.; Akron Standard Mold Co.; L. Albert & Son; American Cyanamid & Chemical Corp.; American Resinous Chemicals Corp.; American Zinc Sales Co.; Anaconda Sales Co.; J. T. Baker Chemical Co.; Barrett Division; Binney & Smith Co.; Godfrey L. Cabot, Inc.; Callaway Mills; Carter Bell Mfg. Co.; Cleveland Liner & Mfg. Co.; Container Co.; Curran & Barry; E. I. du Pont de Nemours & Co., Inc.; Farrel-Birmingham Co., Inc.; General Atlas Carbon; General Latex & Chemical Corp.; R. W. Greeff & Co., Inc.; C. P. Hall Co.; Herron Bros. & Meyer; J. M. Huber, Inc.; Hycar Chemical Co.; INDIA RUBBER WORLD; I. B. Kleinert Rubber Co.; Loewenthal Co.; Midwest Rubber Reclaiming Co.; Monsanto Chemical Co.; Moore & Munger; H. Muehlstein & Co., Inc.; National Rubber Machinery Co.; National Sherardizing & Machine Co.; Naugatuck Chemical Division; New Jersey Zinc Co.; Pequanoc Rubber Co.; Philadelphia Rubber Works Co.; Phillips Petroleum Co.; Precision Scientific Co.; Rare Metal Products Co.; Revertex Corp. of America; H. M. Royal, Inc.; *Rubber Age;* St. Joseph Lead Co.; A. Schrader's Son; A. Schulman, Inc.; Henry L. Scott Co.; Sharples Chemicals, Inc.; Shell Oil Co.; Speed Products Co.; Stamford Rubber Supply Co.; Stanco Distributors, Inc.; Standard Chemical Co.; Stauffer Chemical Co., Inc.; Sun Oil Co.; Tanney-Costello Co.; Textile Proofers, Inc.; Thiokol Corp.; Thompson, Weinman & Co., Inc.; Wm. R. Thropp & Sons Co.; Titanium Pigment Corp.; United Carbon Co., Inc.; U. S. Rubber Reclaiming Co., Inc.; R. T. Vanderbilt Co., Inc.; Vansul & Co.; C. K. Williams & Co.; Wilmington Chemical Corp.; Witco Chemical Co.

## Boston Group Elects Officers

THE Boston Rubber Group held its annual winter meeting and Christmas party on December 8 at the Hotel Vendome, Boston, Mass. Approximately 350 members and guests attended. Following dinner and entertainment a technical session was addressed by S. L. Brous, manager, technical service, The B. F. Goodrich Co. Mr. Brous, speaking on "Plastics in the Rubber Industry," pointed out similarities of elastic plastics and natural and synthetic rubber in the basic chemistry of materials and in processing. He said that no sharp line of demarcation was possible between the two industries, that there was enough room for both plastics and rubber in the field of elastic materials; and that valuable uses for each would be found as the technology of both fields advanced.

Officers elected for 1945 include: chairman, H. A. Atwater, Hood Rubber Co.; vice chairman, J. R. Geenty, Goodall-Sanford, Inc.; and secretary-treasurer, C. E. Reynolds, Cambridge Rubber Co. Members of the executive committee are: R. K. Patrick, Windram Mfg. Co.; J. L. Haas, Hodgman Rubber Co.; and Frederick Langhorst.

Several attractive prizes, supplied by the Group, were distributed.

## Chicago Christmas Dance

THE annual Christmas party of the Chicago Rubber Group was held December 15 at the Morrison Hotel, Chicago, Ill. About 475 members and guests and their wives enjoyed dinner, a floor show, and dancing. W. J. Reidy, American Zinc Sales Co., was chairman of the party committee, and R. G. Penner, Salisbury Rubber Co., was co-chairman. Other committee members were: E. J. Horan, Inland Rubber Co.; J. T. Adams, Sears, Roebuck & Co.; S. M. Davis, C. P Hall Co.; D. M. Pratt, Marbon Corp.; J. P. Sheridan, New Jersey Zinc Co.

The success of the party was in large part due to the generous contributions of the following firms:

Advance Solvents & Chemical Corp.; Airlastic Rubber Co.; Akron Standard Mold Co.; L. Albert & Son; American Can Co.; American Industrial Rubber Co.; American Mineral Spirits Co.; American Roller Co.; American Zinc Sales Co.; Anchor Rubber Mfg. Co.; Auburn Rubber Corp.; B & B Enterprises; Barrett Division, Allied Chemical & Dye Corp.; Bibb Mfg. Co.; Bill Brothers Publishing Corp.; Binney & Smith Co.; Brown Rubber Co., Inc.; Godfrey L. Cabot, Inc.; Callaway Mills; Carter Bell Mfg. Co.; Chicago Belting Co.; Chicago Cutting Die Co.; Cleveland Liner & Mfg. Co.; E. W. Colledge Gen'l Sales Agent, Inc.; Commerce Petroleum Co.; Commercial Solvents Corp.; Continental Carbon Co.; Cupples Co.; Darling & Co.; T. A. Desmond & Co., Inc.; Diamond Wire & Cable Co.; Dryden Rubber Co.; E. I. du Pont de Nemours & Co., Inc.; Eagle-Picher Sales Co.; Farrel-Birmingham Co., Inc.; Felt Products Mfg. Co.; Frost Rubber Works; General Atlas Carbon; General Latex & Chemical Corp.; General Magnesite & Magnesium Co.; Genseke Brothers; C. P. Hall Co.; Herron Bros. & Meyer; J. M. Huber, Inc.; Hycar Chemical Co.; Ideal Roller & Mfg. Co.; Industrial Rubber Goods Co.; Inland Rubber Corp.; International Smelting & Refining Co.; Douglas P. Johnstone; Judsen Rubber Works, Inc.; Kraft Chemical Co.; La-Jone Rubber & Mfg. Co.; Lowenthal Co.; McNeil Machine & Engineering Co.; Marbon Corp.; Midwest Rubber Reclaiming Co.; Monsanto Chemical Co.; H. Muehlstein & Co., Inc.; National Rubber Machinery Co.; National-Standard Co.; Naugatuck Chemical Division, United States Rubber Co.; New Jersey Zinc Sales Co.; Palmer Asbestos & Rubber Corp.; Palmerton Publishing Co., Inc.; Pequanoc Rubber Co.; Philadelphia Rubber Works Co.; Phillips Petroleum Co.; Pittsburgh Plate Glass Co.; Rainfair, Inc.; Resinous Products & Chemical Co.; Rex-Hide, Inc.; Roth Rubber Co.; W. H. Salisbury & Co.; A. Schulman, Inc.; Henry L. Scott Co.;

Sears, Roebuck & Co.; Sherwin-Williams Co.; Stamford Rubber Supply Co.; Stanco Distributors, Inc.; Standard Chemical Co.; Stauffer Chemical Co.; Thiokol Corp.; Titanium Pigment Corp.; Union Asbestos & Rubber Co.; United Carbon Co., Inc.; U. S. Rubber Reclaiming Co., Inc.; Van Cleef Brothers; R. T. Vanderbilt Co., Inc.; Wear Proof Mat Co.; Western Felt Works; Western Shade Cloth Co.; Williams-Bowman Rubber Co.; Wilmington Chemical Corp., Witco Chemical Co.; Xylos Rubber Co.

## L. A. Group Party

THE third annual Christmas party of The Los Angeles Rubber Group, Inc., was held December 5 at the Wilshire Ebell Theatre, Los Angeles, Calif. About 660 persons, including the families and friends of members, enjoyed the vaudeville show which featured many nationally known cinema, radio, and vaudeville entertainers. Miles Reinke, of Reinke, Hiller & Amende, Los Angeles, Calif., was chairman of the event.

During the program officers of the Group for 1945 were introduced from the stage, as follows: chairman, R. E. Hutchinson, Firestone Tire & Rubber Co.; associate chairman, C. M. Reinke, Reinke, Miller & Amende; vice chairman, C. R. Wolter, United States Rubber Co.; treasurer, P. R. Wineman, B. F. Goodrich Co.; secretary, C. H. Churchill, B. E. Dougherty Co.; directors, V. H. Vodra, R. T. Vanderbilt, Co., Inc.; P. W. Drew, Goodyear Tire & Rubber Co.; E. L. Royal, H. M. Royal Co.

Prizes purchased and donated by the L. A. Group were distributed between the acts of the show. The 1944 officers presented A. L. Pickard, the retiring chairman of the Group, with a pen and pencil set. Key chains were given all the ladies through the courtesy of E. L. Royal.

## GR-S Fillers Discussed

A TECHNICAL meeting was held November 16 by the Northern California Rubber Group at the Hotel Claremont, Berkeley, Calif. V. H. Vodra, of R. T. Vanderbilt Co., Inc., spoke on "A Filler Comparison in GR-S." Different volume loadings of 16 common fillers were considered as to their effect on the various physical properties in a standard base formula. Mr. Vodra also discussed the processing of GR-S throughout a tire factory and described new tests and procedures which have been found advantageous to production.

Nominations for officers to serve during 1945 were made. Two books of War Stamps donated by D. C. Maddy, Hycar Chemical Co., were won by E. P. Coxhead, Pioneer Rubber Mills, and G. E. Oliver, Oliver Tire & Rubber Co.

The Christmas party of the Northern California Rubber Group was held December 18 at the Orinda Hacienda in Orinda, Calif., attended by 120 persons —members of the group, their wives, and friends. Christmas corsages and table favors for the ladies were at each place. During dinner the gathering was entertained by a clever magician who acted as master of ceremonies. Pictures of the past two summer outings of the Group were shown. Dancing began at 10:30 p. m.

Incoming officers for 1945, announced at the party, are: president, R. D. Kettering, Oliver Tire & Rubber Co.; vice president, L. I. Shafer, American Rubber Mfg. Co.; secretary-treasurer, Winston Winterbourne, Oliver Tire. Elected to the board were F. W. Swain, Pioneer Rubber Mills; W. D. Good, American Rubber; and G. E. Oliver, Oliver Tire.

After a presentation of gifts to the retiring officers, prizes were awarded to the ladies through the generous contribution of the following firms.

Goodyear Rubber Co.; Farrel-Birmingham Co., Inc.; R. T. Vanderbilt Co., Inc.; Stanco Distributors, Inc.; Naugatuck Chemical Division, United States Rubber Co.; C. P. Hall Co.; Thiokol Corp.; Pioneer Rubber; Oliver Tire; E. I. du Pont de Nemours & Co., Inc.; Hycar Chemical Co.; New Jersey Zinc Sales Co.; Marine Magnesium Products Corp.; Shell Oil Co., Inc.; Shell Chemical Co.; Shell Development Co.; Standard Oil Co.; Martin Hoyt & Milne; Reliance Rubber Co.; Plant Rubber & Asbestos Works; H. M. Royal, Inc.; Universal Rubber Corp.; American Rubber; L. H. Butcher Co.; Imperial Paper & Color Corp.; Pacific Rubber & Tire Mfg. Co.; Oronite Chemical Co.; California Cotton Mills.

## Low Viscosity Plasticizer

"FLEXOL" PLASTICIZER 4GO is a recently developed plasticizer for extruded or calendered compositions of synthetic rubber, vinyl resins, and ethyl cellulose. Its chemical constituency is polyethylene Glycol D1-2-ethylhexoate, and it is a clear, light-colored liquid with a mild odor. The low viscosity and linear structure of the plasticizer are said to impart excellent low temperature flexibility to plasticized compositions. The low vapor pressure insures low losses during calendering or milling operations and is effective in prolonging the service life of plastic articles. "Flexol" Plasticizer 4GO is supplied by Carbide & Carbon Chemicals Corp., which also produces "Flexol" Plasticizer DOP and "Flexol" Plasticizer 3GO. The former is recommended for developing high tensile strength, resilience, and low temperature flexibility in extruded, calendered, and molded Buna N, Buna S, and neoprene. "Flexol" Plasticizer 3GO has found large use in resin and synthetic rubber coated cloth adhesives and other sealants for industrial purposes.

## Versatile Solvent

GVL (Gamma Valerolactone), a colorless mobile liquid, is miscible with or a solvent for most of the widely used chemicals, solvents, dyes, oils, fats, plasticizers, and resins. It is completely miscible with water, but contains no hydroxyl groups. The molecular weight is 100.96 and the specific gravity at 25°/25° C. is 1.0518. Viscosity at 25° C. is 2.18 centipoises. Safe to handle, GVL is said to be relatively harmless for most purposes. One gallon weighs 8.76 pounds. The new solvent is a product of Monsanto Chemical Co., St. Louis, Mo.

## Synthetic Latex Reenforcer

MARMIX, a water dispersion of an organic resin, has recently been introduced for use with GR-S latex wherever high tensiles and abrasion and tear resistance are required. The use of 10 to 30% Marmix with GR-S latex is said to result in tensile values as high as 2,800 to 3,000 pounds in so-called "pure gum" compounds. Samples of it are available from Marbon Corp., 1926 W. Tenth St., Gary, Ind., the manufacturer.

## Wild Rubbers Discussed

THE Ontario Rubber Section of the Chemical Institute of Canada met November 27 at the University of Toronto, Toronto, Ont. About 55 members attended the technical session following a dinner. W. L. Hough, of H. A. Astlett & Co., rubber importer, addressed the group on "Wild Rubbers." He described the wild tree and vine rubbers of South and Central America and of Africa, methods of tapping, and preparation for shipment and grading, and made comparisons of the qualities and properties of the various species. African rubber is now quite different from the African rubber of the past, Mr. Hough said. Appreciable amounts of *Hevea* are now produced on African plantations and are made up in the form of sheets and scrap. While the sheets are not so uniform as the product of the Far Eastern plantations, the rubber is far superior to that produced from the native plant, he stated. The scrap is about the same as good coarse Para rubber and, when washed, appears to be equal in quality. Traces of copper and manganese present in vine rubbers account for the tacky condition in which they sometimes arrive, Mr. Hough suggested, and in conclusion said that it will be a happy day when shipments of smoked sheets and crepe are again arriving from the Far East.

## Montreal Technical Meeting

THE Rubber & Plastics Division, Montreal Section, Society of Chemical Industry, held a joint meeting with the Chemical Institute of Canada on December 13 at the Ritz-Carlton Hotel, Montreal, P. Q., Canada. The dinner was attended by about 100 members with many more coming for the technical session which followed. The speaker was T. E. Perry, Resinous Products & Chemical Co., Philadelphia, Pa., who discussed various methods of utilizing wood despite inherent disadvantages in its structure, such as lack of strength in a direction perpendicular to the grain. One such method mentioned was combining wood layers with rubber, plastics, cloth, metal, or paper. The talk was illustrated with slides and samples showing different methods for strengthening wood.

Prior to Mr. Perry's talk, R. V. V. Nichols spoke briefly on the organization of the Chemical Institute of Canada, which officially commences in January, 1945, and is an amalgamation of several of the chemical societies in the Dominion.

## Processing Aid for Rubber

A SOFT waxy material known as 55-10 was recently introduced to the trade as an aid to smoothing out scorched compounds. When 3% to 5% 55-10 is mixed on a hot mill with not too badly scorched rubber, reclamation of the material is possible without effect on its tensile and elongation. Two per cent. to 5% of 55-10 used with alkali reclaims is said to prevent sticking to a hot mill and to improve tensile and elongation of the cured reclaim. Calendering of stocks containing large amounts of reclaim is also improved by 55-10, it is reported. Its use is also recommended by Sweetman's Laboratories, the manufacturer, with Neoprene, Hycar OR, and GR-S.

# UNITED STATES

## NAM Considers War and Reconversion Problems; New Tire Plants to Be Built

The National Association of Manufacturers' annual meeting in New York, last month, included much discussion of vital import to the rubber industry both in a specific and in a genaral way. On December 2, J. A. Krug, WPB chairman, announced that the production executive committee had included aircraft tires, combat tires, and truck and bus tires and tubes in the National Production Urgency List, and on December 9, in Washington, heads of companies manufacturing 96% of all tires pledged themselves to take immediate steps to institute a seven-day work week for the next 120 days and to cooperate with their employes in efforts to stimulate production. Sherman H. Dalrymple, international president of the United Rubber Workers of America (CIO), issued a statement on the same day addressed to all members of his organization engaged in the production of truck tires and tubes, calling upon them to give all-out effort to the production of these items. Despite these actions work stoppages continued to be reported from Akron in some of the tire plants. A detailed report of Rubber Development Corp. activities through August 31, 1944, reveals new information on natural rubber procurement problems and results, and the views of a Ceylon shipper on the early resumption of rubber production in Far Eastern areas as soon as they are liberated have been obtained.

H. G. Batcheller, WPB chief of operations, December 13 said that a review of tire requirements had led to a decision to build new tire plants to add 1,000,000 tires a quarter to the present output "even at this late date in the war." James F. Byrnes, Director of War Mobilization and Reconversion, announced on December 17 that OPA's planned rollback of civilian tire prices scheduled for December 15 had been postponed until April 15, 1945, in view of the tire industry's present heavy-duty tire production problems.

### NAM Meeting

Some 4,000 of America's top industrial managers attended the War and Reconversion Congress of American Industry—the Forty-Ninth annual meeting of the National Association of Manufacturers—at the Waldorf-Astoria Hotel, New York, N. Y., December 6-8. The theme of the three-day session was "Producing for Victory—Preparing for Peace." As a part of the program the congress sponsored meetings between ranking procurement officers of the Army, Navy, and WPB and the manufacturers who produce the nine items most critical in the final spurt to victory—superfortresses, heavy tires, artillery ammunition, heavy-heavy (cq) trucks, small arms ammunition, heavy field artillery, technical field wire, dry-cell batteries, and navy rockets.

Experts of ten federal agencies which guide government policy on contract termination and surplus disposal were present to advise industry on these problems. Emphasis was placed upon the fact that termination and disposal must remain essentially a part of the war effort until after victory. Special sessions explored problems of war and transition, labor relations, world reconstruction, distribution, veteran employment, foreign trade, and industrial research and patents.

### Krug Lists Critical War Items

A plea to industrialists to increase lagging war production was made at the opening session by Lt. Gen. Brehon Somervell, commanding general, Army Service Forces. Reemployment in critical war industries of about 300,000 out of an estimated 1,000,000 workers who have left war jobs is needed to achieve present production goals, he said. General Somervell warned that 40% of all major military programs are behind schedule. Newly developed needs or depleted reserves have placed 27% of these programs on the critical list, he added.

Mr. Krug repeated General Somervell's estimates and enumerated the most critical programs.

"For the war in Europe these include heavy artillery ammunition and heavy artillery, big trucks and the tires they run on, repair parts of all kinds, and cotton duck for tenting," he explained.

### Heavy Tire Needs Revealed

Representatives from leading tire companies were told by Brig. Gen. T. M. Osbourne, Requirements Division, and Brig. Gen. J. K. Christmas, Deputy Chief of Ordnance, the specific reasons for the urgent need of more heavy truck tires in war theaters. J. H. Clark, director of the Rubber Bureau, stated that the industry was believed capable of delivering the demanded 25% increase in production from existing manpower and facilities.

A further increase of perhaps 15% was projected as a possibility through use of emergency equipment and a restudy of production schedules and potentialities. Speculation also suggested a still further gain from technological changes in manufacturing processes and tire structure. Such increases would, however affect only the longer range. Increased production now, it was declared, is the sole immediate solution.

A 60-day top emergency rating over all other "must" programs has been instituted to cope with the tire crisis. Industry was assured that requests for emergency equipment would receive quick acknowledgment if it told government what is needed.

The Army officers who had personally investigated the reasons for requirements running ahead of previous estimates cited as some of the principal causes the unexpected burden placed on motor transport by inadequacies and destruction of European rail facilities; necessity of motor transport of troops and equipment from ports to the fronts; lack of maintenance of French motor roads for many years; and other circumstances which make ordinary United States standards of tire service inapplicable.

Inspection of tire discards, it was declared, showed 60% of removals compelled by injury from shells, debris, and cuts which often prevented repairs of any degree.

One answer of industry to the Armed Forces and the Rubber Bureau's challenge, laid before the meeting, was given by Harvey Firestone, Jr., president of the Firestone Tire & Rubber Co. That company, he declared is "fully aware of this situation and I can assure you that you can have anything you want."

Howard Jordan, president, Pennsylvania Rubber Co., presiding officer at the meeting, further assured the government that needs would be recognized, that he was confident of the industry's ability to supply the needs, and that industry accepted without reservation the demands for production at full capacity.

### Army Tires Output Down

It has been learned that though tire requirements have been set as low as possible, production has totaled a steadily declining percentage of demand in 1944. In the first quarter of the year production was 99% of the Armed Forces allocation; 97% in the second quarter; 88% in the third. Expectations for the fourth quarter were 86% and 83% for the first quarter of 1945.

The production of heavy tires has recently been termed the number one bottleneck in the whole war program. The industry has estimated that it could obtain a 20% increase if all plants were fully manned. Additional tire making equipment is being installed in tire plants which is expected to bring substantial increases in production by the second or third quarter of 1945.

Plants manufacturing truck tires and tubes have been placed on a seven-day-week schedule for four months in an effort to meet the military requirements. To facilitate the supply of army tires on the front battle lines in Europe the State Department is arranging for clearances for materials for American-owned tire plants in Spain and Switzerland, it was learned. It has been pointed out that the need of tire replacements is going up because of the increased tempo of the war. At present 500,000 wheeled vehicles are in operation on the eastern front, which means 3,000,000 tires in daily use. General Eisenhower warned in early December that large numbers of vehicles will be tied up by early February unless the tire supply is increased. In mid-December General Somervell stated that the Army will be 472,000 tires short of its requirements for the first quarter of 1945 unless production is increased.

There is little hope for improving the service life of tires in overseas army duty. The quality and length of service of synthetic tires has been reported by the War Department as less than that of natural rubber tires. Maintenance and operating conditions in war areas do not permit the high levels of service common to peacetime standards. Overloading and high speeds, essential in moving men and materials to battle lines, are normal conditions of war. The lengthening supply line from ports to battle fronts as the American armies move forward is another important factor in tire requirements, and yet another is the problem of distribution. Besides innumerable sub-depots, the Armed Forces must maintain large stocks of tires in 80 places in the world. Adjustment of stocks is a difficult procedure, especially in areas where means of communication and transportation are inadequate.

### Wire Shortage Critical

Col. R. L. Hart, director of the Army Signal Corps' production division, told a

group of 100 wire manufacturers convened in a special session of the NAM meeting that a "critical shortage is anticipated in all theaters of war operation unless unfilled needs for thousands of miles of tactical field and telephone wire are supplied during the next month or so." To increase production, he stated, specifications have been revised to permit the use of lower grades of steel wire. Previously required grades are in short supply. The use of rayon in place of cotton yarn has also been permitted for braiding. It is understood that the supply of rubber for wire insulation is adequate at present.

**Dewey Cites Achievement of Free Enterprise**

Speaking on "Research, Free Enterprise, and National Defense," Bradley Dewey, president of Dewey & Almy Chemical Co. and former Rubber Director, told a session of the manufacturers' congress that only the teamwork of scientists, technical men, and executives trained by big companies has enabled the United States to carry out its swift armament program after Pearl Harbor. Colonel Dewey ascribed this great achievement of teamwork to the American system of free enterprise.

"The synthetic rubber industry, with whose details I am familiar, seems to me to exemplify this teamwork," he said. "When all is said and done, the actual work—the job itself—was done by the research chemists and chemical engineers, the mechanical engineers, the construction and production men of industry. I emphasize that the big job was done by men with background and experience gained on their jobs with big chemical companies, big rubber companies, big oil companies, and big engineering and construction companies."

**Postwar Developments Described**

Gustav Egloff, research director of Universal Products Co., Chicago, Ill., and president of the American Institute of Chemists, in a session devoted to the manufacturers' association's program for peace, pictured the quick beginning after the war of an era in which new processes for turning out new products will provide maximum employment; while increased purchasing power will assure good markets. He told how new developments in foods, housing, clothing, health, communications, and transportation will give mankind a fuller and longer life. Hundreds of some 25,000 types of synthetic rubbers already developed will be adapted to myriad new uses, Dr. Egloff said. He predicted a large market for heat conducting rubber and synthetic rubber for the elimination of vibrations.

"Synthetic rubber is here to stay, and we have only started developing types for new uses. It will be competitive with natural rubber not only on a quality, but also on a price basis," the research chemist declared.

Extensive development and use of plastics and glass were also predicted by Dr. Egloff.

**Employment and Taxation Problems Discussed**

Paul Raish, head of Firestone's veterans' service bureau, spoke on "Jobs for the Handicapped" to a forum on veteran reemployment. He described a detailed plan for the proper placement of handicapped veterans in the Firestone organization. Apprenticeship and on-the-job types of training are available for the handicapped at Firestone.

Jobs await at least 3,000,000 homecoming veterans in the nation's free system of private industry, which employs 25% of the country's labor force, Harry L. Derby, president, American Cyanamid & Chemical Corp., told the assembled manufacturing executives.

H. E. Humphreys, Jr., discussed taxation. His talk appears on page 429 of this issue.

William P. Witherow, president, Blaw-Knox Co., and chairman of NAM's executive committee, gave labor an assurance of 30% more postwar jobs in manufacturing industry over the last peacetime year and at the same time pledged that shortages in nine battlefront items urgently demanded by the military would be speedily supplied. The Pittsburgh executive emphasized that the keylog in the current production jam, originally caused by shifting battle conditions, was manpower.

**Cartels Condemned**

Robert M. Gaylord, president of NAM and of Ingersoll Milling Machine Co., strongly attacked cartels in any form, whether of governments or industries and declared that world prosperity will come only from free private enterprise. He deplored French plans to nationalize its coal industry and British acceptance of collectivistic principles in the name of security. Calling for an "intensely realistic" United States foreign policy, he warned that "giving away" American goods on long-term credits is little more than "international made work."

Discussing cartels the NAM head said, "If other nations choose to sanction them, we cannot complain, but they cannot force us to cartelize our trade. We can compete as free enterprise, hampered perhaps at the beginning, but in the long run favored because competition will spur us on; while the lack of it lulls them to sleep."

In a later session the association approved its president's condemnation of cartels by its adoption of a six-point "Victory for Freedom" program. It was the first outright opposition to international trade agreements ever made by a group of industrialists. Also included in the adopted statements was a resolution favoring a sound currency based on gold as essential to self-government.

Speaking at the annual dinner, Frederick C. Crawford, NAM chairman, declared that the German nation has plenty of tires, copper, and food. Mr. Crawford, recently returned from an inspection tour of European war zones made at the request of the War Department to gain first-hand information of material shortages, said that if the necessary gasoline could have been transported to Gen. G. S. Patton's Third Army, "there is no doubt that it would have gone straight to Berlin."

Ira B. Mosher, vice president and general manager of the American Optical Co., Southbridge, Mass., was elected 1945 president of the association. Among new directors elected was J. H. Pew, president, Sun Oil Co. Eleven regional vice presidents were elected for 1945, including: Lamont du Pont, chairman of the board, E. I. du Pont de Nemours & Co., Inc.; William R. Rand, vice president, Monsanto Chemical Co.; John L. Collyer, president, B. F. Goodrich Co.; and W. B. Bell, president, American Cyanamid Co.

**Tire Industry Manpower Needs**

Estimates of the manpower needs in the tire industry from various sources during the month rose higher and higher, and in view of the fact that the special programs instituted by the WMC in August to find workers for the tire plants are now revealed as having been only moderately successful, it seems more than likely that any immediate increase in tire production will have to be obtained from longer hours of work by the present operators unless future recruiting has better results. A report issued by Paul V. McNutt, Chairman of the War Manpower Commission, on November 28, following a WMC survey during the third week in November, listed an urgent need of 1,000 workers for tire and tube production in Los Angeles, Calif., Akron, O., Jackson, Mich., and the New England States. After completion of several new facilities and reconversion of others, a minimum of 4,500 additional workers will be needed, about 3,000 in Eau Claire, Wis., 800 in Waco, Tex., and 700 in Miami, Okla., this report stated.

Mr. Krug on December 2, in announcing that the Production Executive Committee had expanded the National Production Urgency List to include aircraft tires, combat tires, and truck and bus tires and tubes, reported that figures on manpower requirements to operate existing facilities at capacity were 6,258 male and 986 female workers, according to information received from the tire industry by the WPB Rubber Bureau. At the same time, WPB released figures on manpower needs for heavy-tire construction in the Ohio area and in California. The former needs 872 men; while California needs 1,115 men and 183 women. With all facilities fully manned, the industry can produce 4,695,341 heavy-duty tires in the first quarter of 1945. It was pointed out that this is 21% more than the estimated output of 3,886,263 of these tires projected on November 1.

On December 17 the WMC announced an immediate critical need of 2,300 workers in the urgent military tire production program. An additional 8,500 workers will be needed during the next few months as production facilities are expanded. This figure raises the total number of workers required to 10,800. It was emphasized that the bulk of these manpower needs were for laborers, maintenance workers, and that tire production jobs are not confined to men, but that many women are needed. The present and future needs in regions not previously reported were given as: for West Haven and Norwalk, Conn., present needs 285, total needs 1,030; Tonawanda, N. Y., present needs 100, total needs 200; Jeannette, Conshohocken, and Carlisle, Pa., present needs 212, total needs 452; Cumberland, Md., present needs, 30, total needs, 420; Akron, Barberton, Dayton, Warren, and Findlay, O., and Jackson, Mich. (future Akron needs not available and not included), present needs 860, total needs 1,133; Gadsden, Ala., and Natchez, Miss., present needs 28, total needs 277; Des Moines, Iowa, present needs 34, total needs 784; Miami, Okla., and Topeka, Kan., present needs none, total needs 1,250; Los Angeles and Oakland, Calif., present needs 708, total needs 1,297.

As a contribution to the tire industry manpower supply, the Army has decided to furlough 1,200 men with experience in tire building for 90 days starting by Christmas. Of this total 600 are scheduled to go to the Pacific Coast. The men will remain in uniform except during working hours. Plants which need only additional men to realize an immediate increase in tire production will get preference in the

allocation of furloughed soldiers over plants which also need additional machinery and other facilities to increase their output.

**Truck and Bus Production Estimates**

In another report on critical war production programs prepared by Mr. Batcheller, and released on December 7, it was stated since the beginning of 1944, there has been a 70% increase in manufacturing facilities for tires 9 to 14 inches in cross-section. Actual unit production increased 55%, from 178,300 units in January to 276,000 units in October. This report reveals that despite the fact that high priorities were given referrals last August by the WMC in order to obtain the 5,000 men considered necessary at that time to man existing facilities for heavy-duty tires, the net gain after separations has been only 2,800, leaving 2,200 still required. With the expansion of the critical list to include medium- and small-size truck-bus tires and jeep tires, a preliminary estimate indicates the need of 5,000 men and 1,000 women, according to this source. The following table compares manufacturers' estimated production (given additional labor to man all facilities) with stated requirements of the Army, Navy, and other claimants. It also compares these production estimates with the requirements of the claimant agencies after the requirements had been screened down to minimum needs.

ALL TRUCK AND BUS TIRES (INCLUDING JEEP TIRES) FIRST QUARTER, 1945.
(Nov. 27, 1944 Mfrs' Prod. Est.—Add'l Labor Furnished vs. Screened Req.)

| | Mfrs. Estimated Production with Additional Labor Furnished | Stated Requirements | Indicated Deficit *vs.* stated Requirements | Screened Requirements | Indicated Deficit *vs.* Screened Requirements |
|---|---|---|---|---|---|
| A-1 combat and runflat..... | 31,175 | 33,950 | 8% | 32,540 | 4% |
| A-2 extra-large 16.00's and up... | 13,005 | 14,765 | 12% | 13,332 | 2% |
| A-3-A large—12.00's, 13.00's, 14.00's ..... | 112,367 | 191,661 | 41% | 160,492 | 30% |
| A-3-B large—9.00's, 10.00's, 11.00's ..... | 906,119 | 1,412,315 | 36% | 1,022,621 | 11% |
| A-4 medium—dual-bead, all 10-ply through 8.25's ..... | 724,773 | 1,236,755 | 41% | 702,053 | + 3% |
| A-5 small—single bead, 8-ply and under ..... | 1,827,157 | 2,317,023 | 21% | 1,981,685 | + 8% |
| A-6 15 and 16-inch through 7.50's | 1,124,925 | 1,239,322 | 9% | 1,029,141 | 9% |
| Total ..... | 4,739,521 | 6,445,791 | | 4,941,864 | |

**Seven-Day Week Adopted**

At a meeting in Washington in the office of Lieut. General Somervell, the heads of companies manufacturing 96% percent of all tires, on December 9, pledged that since "critical production demands can best be satisfied with complete cooperation and mutual understanding between labor and management; that there be no change in hours, wages and working conditions except in the interest of greater production; that we intensify and improve our efforts to settle all problems and grievances and to negotiate with union representatives in accordance with the best means offered under collective bargaining; that we do everything possible to support the pledge and program of all rubber workers in America—CIO and others, and cooperate with them in their effort to prevent work stoppages and stimulate uninterrupted production; that we take immediate steps to make effective for the next 120 days a seven-day week for production of these critical items; and that we let no considerations interfere with our determination to keep all lines going full blast during this emergency when these critical items must be delivered to our fighting men."

All manufacturers attending the meeting signed the statement. Owing to the short notice of the meeting a few manufacturers were unable to be present. Copies of the statement were forwarded to them, and it is expected that every manufacturer making these critical items will participate in this program. The following names were signed to the statement: Goodrich, Mr. Collyer, T. G. Graham, and J. J. Newman; Dayton Rubber Mfg. Co., A. L. Freedlander; Goodyear Tire & Rubber Co., E. J. Thomas; Pennsylvania Rubber Co., H. W. Jordan; Seiberling Rubber Co., H. W. Shrank; U. S. Rubber, W. H. Cobb; Mansfield Tire & Rubber Co., C. A. Gibson; Mohawk Rubber Co., R. E. Bloch; General Tire & Rubber Co., Chas. Jahant; Master Tire & Rubber Corp., J. S. Shaefer; Firestone, L. R. Jackson and J. E. Trainer; Pacific Rubber & Tire Co., E. W. Booz; Lake Shore Tire & Rubber Co., M. H. Clarke; Pharis Tire & Rubber Co., R. M. Reel; and Armstrong Rubber Co., James A. Walsh.

Mr. Dalrymple also met with General Somervell; then the former issued a statement, copies of which were distributed to all members of his organization responsible for the production of truck tires and tubes, requesting that they "report regularly for work on your respective shift; give all-out effect to the production of these critically needed tires; and, adhere to and comply with our pledge to refrain from work stoppages during this war emergency regardless of the provocation."

**$50,000,000 Tire Expansion Program Planned by the Government and the Rubber Industry**

In a drastic emergency action WPB through Mr. Batcheller announced on December 13 that following a series of conferences with WPB and Army officials and representatives from tire companies and an "exhaustive survey" of all present facilities, construction of enough new plants to provide an additional 4,000,000 tires a year for the Armed Services had been decided upon. Although these new plants cannot possibly be in production for 10 or 12 months, it is understood that the action is being taken to be sure of enough tires in the event of the continuation of the battle in Europe during 1945 and for the increasing demands for tires for the Asiatic theater of war. Where the new plants will be built and what companies will operate them is being decided by the WPB and the WMC, and it was reported that Mr. Clark had stated that the availability of labor will be a major factor in determining where the new plants will be constructed. The cost of the new plants was estimated at about $50,000,000. A survey of needs of such items as carbon black and rayon and cotton cord in view of the future increased consumption of rubber for tires is being made, and new capacity in these fields may be required.

**L. D. Tompkins in OWMR**

It was also announced on December 13 by Mr. Byrnes, that L. D. Tompkins, former Deputy Rubber Director, was to return to Washington as a special assistant to Mr. Byrnes to aid in the coordination of the rubber products program, with particular attention to the critical tire shortage.

**Rubber Development Corp. Report**

A detailed report on the activities of Rubber Development Corp. and Rubber Reserve Co. for the period of April 1, 1942, through August 31, 1944, as submitted to Leo T. Crowley, of the Foreign Economic Administration, by Douglas H. Allen when he resigned as president of Rubber Development on September 30, 1944, contains certain facts not previously publicly recorded. The total quantity of rubber purchased from all foreign sources during the period April 1, 1942, to August 31, 1944, was 395,926,720 pounds, or about 180,000 long tons, at a total cost of $173,166,634.88, or a cost per pound of 43.74c. From Latin America alone the amount of rubber acquired was 152,949,440 pounds, or about 69,500 long tons, at a cost of $104,041,899.62, or a cost per pound of 68.02c. Expenditures for experimental Cryptostegia plantation work in Haiti have not been included in this expense. This project, which was abandoned in the Spring of 1944, resulted in a loss of $6,343,320.23. The amount of rubber from Liberia was 73,431,680 pounds, or about 33,300 long tons, at a total cost of $20,403,839.33, or a cost per pound of 27.79c.

During the same period from Ceylon and India, under allocation of the Combined Raw Materials Board, came 163,717,120 pounds, or 74,500 long tons, and from Africa, except Liberia, 5,828,480 pounds, or 2,650 long tons, for a total of 169,545,600 pounds, or 77,150 long tons, at a total cost of $48,720,805.93, or a cost per pound of 28.74c. In addition there was imported from other Far Eastern areas after April 1, 1942, 83,764,800 pounds, or 38,000 long tons, which was purchased and shipped before that date. Total rubber acquired from Far Eastern and African sources during the period, therefore, amounted to 253,310,400 pounds, or 115,150 long tons.

This report calls attention to the fact that in considering unit costs of 68.02c per pound for rubber from Latin America, 27.79c for rubber from Liberia, and 28.74c for rubber from Ceylon and India, with an overall average of 43.74c, it is of interest to note that rubber in the last war, when all major producing sources were open to the Allies, cost an average of around 75c a pound and that in the peacetime years of 1925-26 plantation rubber sold as high as $1.20 a pound and maintained an average of 61c a pound. At the present there is a substantial demand for rubber at prices ranging from $2 to $5 per pound in areas outside the cooperative controls established by the international rubber agreements.

A table of comparative satistics on natural rubber imported into the United States during the years 1939 to 1943 inclusive and during the first eight months of 1944 and is of considerable interest and appears on the next page.

The checkered organizational history of natural rubber procurement is reviewed from April 15, 1942 to date. The report states that at the time of its formation in 1943, Rubber Development Corp. was faced with the dual problem of continuing and intensifying efforts to procure the maximum

IMPORTS OF CRUDE RUBBER AND RUBBER CONTENT OF TIRES AND TUBES ACQUIRED
(Shipping Weights—Long Tons)

| United States Imports of Crude Rubber,* W. Hemisphere, Chiefly Wild Rubber† | 1939 | 1940 | 1941 | 1942 | 1943 | 1944 to Aug. 31 |
|---|---|---|---|---|---|---|
| Amazon Countries | 4,958 | 5,939 | 4,779 | 5,872 | 12,990 | 13,684 |
| Mexico, Guayule | 2,232 | 3,634 | 4,881 | 5,548 | 7,678 | 5,237 |
| Central America | 33 | 54 | 88 | 630 | 2,315 | 1,724 |
| Other America | 764 | 1,433 | 1,040 | 2,441 | 3,211 | 1,603 |
| Salvaged Rubber‡ | .... | .... | .... | 55 | 361 | 260 |
| Total American | 7,987 | 11,060 | 10,788 | 14,546 | 26,555 | 22,508 |
| Liberia, Plantation Rubber | 5,331 | 6,917 | 7,293 | 9,897 | 13,656 | 11,950 |
| Total Program Areas | 13,318 | 17,977 | 18,081 | 24,443 | 40,211 | 34,458 |
| Ceylon, India Africa (except Liberia) and Other Far Eastern§ | 486,298 | 800,647 | 1,010,926 | 258,155 | 19,706 | 37,969 |
| Grand Total | 499,616 | 818,624 | 1,029,007 | 282,598 | 59,917 | 72,427 |
| Rubber Content of Tires and Tubes Acquired in Brazil¶ | ..... | ..... | ..... | 2,765 | 2,742 | 1,365 |

* Source: United States Department of Commerce.

† The above figures are after retention by certain of the producing countries of stipulated quantities to supply the essential needs of those countries.

‡ RDC records show salvaged rubber imported from foreign countries at 1,030 tons for 1943; 2,841 tons for January-August, 1944. These imports are for the most part included above according to "country" sources instead of as "salvaged rubber."

§ The 1943 imports include 307 tons acquired as a Naval war prize.

¶ Source: Commercial Research Section, RDC.

possible quantity of natural rubber while at the same time liquidating or adjusting to a sound and realistic basis any projects found to be impractical or out of proportion to the results likely to be achieved and, in general, make sure that all operations were placed upon a businesslike and efficient basis insofar as wartime conditions and the accomplishment of war objectives permitted. The maximum number of American employes in Washington and in all of the 16 countries in which Rubber Development operates was 725 on June 30, 1943, and on August 31, 1944, 440. Progressive reductions in American personnel may be expected as additional local personnel are trained and available.

In Brazil and Mexico, Rubber Development has been engaged in the purchase of tires and tubes. In Mexico the raw materials are supplied, while in Brazil up to the present time all such products have been manufactured from rubber produced in Brazil and from reclaimed rubber, although an arrangement is in process of negotiation whereby Brazil will use a substantial amount of synthetic rubber to be supplied by the United States and thus permit a larger amount of natural rubber to be exported to the United States. From April 1, 1942, to August 31, 1944, purchases of tires and tubes by Rubber Reserve and Rubber Development in Brazil and Mexico aggregated $24,310,837.

It is admitted that while the problem of recruiting labor for tapping wild rubber trees in South and Central America is difficult, nevertheless the results have been disappointing. Approximately 18,800 laborers had been moved into the Amazon from South Brazil up to August 31, 1944, plus 14,484 (including 7,435 men) moved as families up to February 28, 1943. In Central and other parts of South America, upward of 3,000 laborers have been moved into rubber producing areas. The contribution made by Rubber Development to these labor movements will aggregate approximately $4,800,000. This program includes a commitment by the Government of Brazil to move an additional 8,000 laborers to the Amazon.

RDC has endeavored to avoid direct financing of rubber production and has sought to encourage private capital to engage in this production. Supplemental financing has, however, been found necessary because of various reasons, including the general dearth of cash capital in Latin America and the reluctance of private capital to expose capital to the extraordinary risks of rubber financing. Loans and advances of Rubber Development outstanding in all areas as of August 31, 1944, totaled $2,243,511, excluding the investment of $3,000,000 in the capital stock of the Banco de Credito da Borracha (Rubber Credit Bank) set up to finance rubber production and to act as the sole buyer of rubber in Brazil. The bank's total capital is $7,500,000, of which the Government of Brazil subscribed $4,500,000. Under the international rubber agreements with all 16 producing countries concluded between March and October, 1942, expenditures on building roads and trails, the recruitment and movement of labor, loss on production loans, the provision of transportation facilities, etc., amounted to $13,300,000 through August 31, 1944.

Reference is made to the remarkable success of the novel experiment in international relations necessary in working out the negotiations with the foreign governments concerned with the practical implementation of the rubber agreements that had been entered into with the 16 producing countries of Latin America, plus Liberia. The greatest appreciation is expressed for the contributions of the governments of these countries in furnishing their own funds for the furtherance of a program which has as its sole purpose the exportation of maximum quantities of natural rubber to the United States at a fixed price, despite the fact that growing scarcity has made that price only a fraction of the price which could have been obtained elsewhere. In face of increased production of natural rubber and increased demands by the citizens of the producing countries for tires for domestic use or export, these countries have effected a reduction in their local consumption of rubber amounting to more than 40% of their prewar use. These contributions cannot be too highly praised and are too little understood, Mr. Allen states.

Natural rubber is more urgently needed than ever before, and figures on the importation of 72,427 tons of natural rubber into the United States in 1944, as compared with 42,912 tons in 1943, together with an increase in our reserves of synthetic rubber between January 1 and October 1, 1944, from 41,568 tons to 119,780 tons, do not make less serious the fact that our reserves of natural rubber declined from 139,594 tons on January 1, 1944, to 92,371 tons on September 30, 1944. RDC, therefore, must continue and intensify its efforts to secure the maximum possible quantity of natural rubber from all available foreign sources, Mr. Allen concludes.

### Early Resumption of Rubber Production Seen by Ceylon Shipper

British Empire rubber producers are currently centering their attention on getting rubber from liberated producing areas as quickly as possible at the conclusion of the war, according to E. Mackenzie Hay, chairman of the British Federation of Commodity & Allied Trade Associations, Ltd., London, England, and chairman of J. H. Vavasseur & Co., Ltd., London and Ceylon rubber shipper. Mr. Hay, recently in the United States as a British delegate to the International Business Conference at Rye, N. Y., said the practical problems of distribution are now being studied and that likely a number of men who have had wide experience in distribution will be sent to the Far East rubber producing areas to provide advice and assistance on shipping and other problems of distribution. He stated that many competent authorities anticipated that a normal two or four months' supply may be found intact and ready for shipment in the producing areas at the end of the war. Some production has been carried on by natives, it is believed, and these stocks, amounting to at least 50,000 tons and possibly 100,000 tons, should be available for almost immediate shipment.

A postwar reduction in the price of crude rubber can be expected. Mr. Hay pointed out, because freight, insurance rates, and other inflated costs exceedingly high in war time, will be materially lower. Attempts will likely be made, he said, to limit the grades of rubber to fewer than have been known in the past, and such standardization should also effectively assist to lower overall costs. These attempts may aim at world standardization so that the accepted grades will be uniform for all Far East producing areas and for all consuming countries. A concentration of remilling plants which became a tendency before the war will probably be intensified as an aid to standardization, Mr. Hay asserted.

Recalling that the 1939 model was the last car made in England and that the tires on these cars are fast approaching the end point of their usefulness, Mr. Hay said that a large tire business can be expected in England after the war both for new cars and in the replacement field.

Producers of crude rubber are reconciled to the fact that there is a wide field for synthetic rubber for articles, he declared, and this demand is not necessarily in competition with crude rubber.

"It is only realistic," he contended, "to realize that the synthetic industry and the capital invested in it is not necessarily competitive, but complementary to the production of crude rubber, for a much wider application of both synthetic and crude in industrial and consumer uses is expected in the postwar world."

Although no definite announcement has been made concerning the consideration being given at official government levels for the orderly production of rubber after the war, Mr. Hay felt that international cooperation will be necessary to maintain a balance of production in all centers. Unbalanced production in one center would certainly upset other areas of production,

he warned. What form such international cooperation would take, Mr. Hay could not say. He expressed the opinion that advisory and consultative arrangements through producers and consumers and market interests would achieve a more stable influence in prices than could an arbitrary body. Groups of producers, consumers, and market interests meeting through commodity exchanges could pool their respective knowledge for production and demand. World opinion has agreed that both the manufacturer and the ultimate consumer must be adequately represeneed. While representation of the ultimate consumer could only be by a government agency, authority should not rest in the government, Mr. Hay declared. Rather, the functions of government representation, he said, is to give advisory counsel and guidance and to see that benefits are passed on to the peoples.

Mr. Hay declared that he would be reluctant to see any kind of restriction placed upon expansion of the rubber industry, but he warned that in the transitional stage from war to peace it may be necessary to submit to controls which can be relaxed as the world returns to normalcy and can eventually be dispensed with altogether.

## Rubber Restrictions Eased

Two directions were issued for R-1 on November 21, as follows:

Direction 2: "Notwithstanding the provisions of List 25, Appendix II to Rubber Order R-1, GR-I (Butyl) synthetic rubber may be consumed after December 1, 1944, in the manufacture of truck tubes for both government and civilian orders in cross-sectional sizes 7:00 and 7.50. Butyl consumed for this purpose must of course come out of each consumer's allocation of Butyl synthetic rubber for the manufacture of tubes."

Direction 3: "Notwithstanding the provisions of paragraph (a) (2) of List 25, Appendix II to Rubber Order R-1, passenger tire tubes may be made in any number of grades, including conventional and special types (puncture sealing types, heavy gage types, dual air chamber types, etc.): *Provided,* That (1) they are manufactured in conformity with the regulations of List 25 and (2) no more crude rubber is consumed per tube of any grade than is consumed in the manufacture of a conventional type tube in the same size."

Direction 4, issued December 14, rules that each manufacturer of conveyer belting and roll lot transmission belting shall ship at least 40%, but not more than 75%, by tonnage, of his monthly production of such belting to fill government orders, including direct orders placed by the British Purchasing Commission. Any such manufacturer who can devote more than 75% of his facilities for these products to fill government orders without interference with shipments for essential civilian use may communicate with the Director of the Rubber Bureau, War Production Board, Washington 25, D. C., so that an appropriate adjustment of his shipping schedules can be made.

No. 5 issued December 13, revises the order of preference of product groups on List 32, Regulations for the Use of High-Tenacity Rayon Cord, of R-1. While Direction 6, effective January 1, 1945, removes from allocation control all types of Buna N; Hycar OS; and Styraloy. Thus deliveries of these synthetics may now be made without restriction for uses permitted under R-1 provided that such deliveries and transfers are reported as shipments or receipts on form WPB-3410 for the calendar month in which the transactions occur.

Conservation Order M-124 — Rubber Yarn and Elastic Thread—was amended December 1 to permit the direct sale or delivery of natural rubber thread produced after January 1, 1944, on orders of the Army, Navy, United States Maritime Commission, War Shipping Administration, or the Veterans Administration and use by those agencies for incorporation in aircraft and aircraft equipment, parachutes, or barrage balloons. The amendment removes restrictions under which all natural and covered rubber thread and yarn produced prior to January 1, 1944, was stockpiled by DSC.

Also authorized is the use of natural rubber thread for other essential military purposes when synthetic rubber thread proves unsuitable. Application for permission to use such thread must be made by letter to WPB, giving the name of the contracting agency, the contract number, the end use and pounds required, and the core size.

The amendment also provides a program for granting preference ratings to obtain synthetic rubber thread for the manufacture of a specified list of items of safety equipment and elastic health and surgical equipment. Applications for such priority assistance must be made by letter to the Safety and Technical Equipment Division, WPB, Washington 25, D. C., at least 15 days prior to the beginning of any calendar quarter.

As far as practicable, priority assistance will be granted for the production of the particular item manufactured by the applicant from natural or synthetic rubber thread on the basis of his average quarterly production of the item in 1943. Provision is also made for an equitable distribution when possible of synthetic rubber thread to those who did not produce a particular item in 1943, WPB said.

### Other WPB Changes

Conservation Order M-286, as recently amended, provides that certain protective papers may now be used for packaging specified products, including rubber and rubber goods. These specialty papers are glassine, greaseproof, and vegetable parchment papers, which have grease, air, and moisture-vapor resistance.

Because the supply of acrylonitrile exceeds the demand, Schedule 56 of M-300 was revoked December 19.

All restrictions on the use of tantalum were removed by revocation of Order M-156 on December 6.

Distributers of farm machinery and equipment are now able to obtain AA-2 preference ratings for purchasing 20 specified kinds of repair parts for resale to dealers serving farmers, WPB announced December 4. Among these products are: rubber belting, pressure gages, rubber inflations and tubing for milking machines, electric motors, and control switches, thermometers for incubators and brooders; rubber grain drill tubes, pressure relief valves, harvester webbing and banding.

Allocation Order M-30 was revoked December 31, and ethyl alcohol made subject to General Allocation Order M-300.

Allocations of synthetic organic detergents for essential civilian use in 1945 may be made in accordance with priority ratings obtained by customers, WPB told the Synthetic Organic Detergents Industry Advisory Committee at a recent meeting. This new policy, giving the producer the authority to ship to customers on the basis of priority ratings, reflects a slightly easier supply of the detergents, WPB officials said. However, they pointed out, at any time WPB may directly allocate for an essential civilian requirements if the need arises. Synthetic organic detergents are governed by Schedule 44 of Order M-300.

## Dog Gas Mask

The Chemical Warfare Service has adopted a gas mask for war dogs, designated as Mask, Gas, Dog, M6-12-8. The principal part of the mask is a coated duck muzzle which fits over the dog's snout and is made airtight by a neoprene rubber seal which goes around the head just above the eyes. Incoming air is purified in two drum-shaped canisters screwed to the muzzle piece. Wind-borne body scents can be detected through the mask by well-trained scout dogs. The mask weighs 2.1 pounds and will fit 97% of all war dogs. The valves are made by the Scoville Mfg. Co., Waterbury, Conn.; the facepiece by the Baldwin Rubber Co., Pontiac, Mich.; and the valve disks by H. O. Canfield Co., Bridgeport 1, Conn.

**The Office of Defense Transportation,** Washington, D. C., on December 20 announced that a survey is being conducted to determine the number of heavy-duty truck tires required to put all idle highway tank trucks to work and to keep those now in operation working 130 hours a week.

**Defense Plant Corp.,** Washington, D. C., has authorized the construction of a channel-type carbon black plant near Odessa, Tex., at an approximate cost of $2,750,000. United Carbon Co., Inc., Charleston, W. Va., will operate the plant.

**Pittsburgh Plate Glass Co.,** 632 Duquesne Way, Pittsburgh, Pa., has appointed C. Robert Fay comptroller, succeeding Stuart M. Campbell, resigned. Mr. Fay previously had been with Westinghouse Electric & Mfg. Co. for several years.

Pittsburgh Plate Glass has adopted a new official insignia consisting of the letters PPG interlocked, in order to facilitate the ready recognition of its many and varied paint, glass, brush, chemical, and plastic products. This insignia will appear on all labels or other means of product identification, advertisements, letterheads, packages, signs, or wherever the company signature might be used throughout its entire organization.

The Columbia Chemical Division of Pittsburgh Plate, in anticipation of greatly increased industrial activity on the Pacific Coast, has acquired the plant and sales organization of the Pacific Alkali Co., Bartlett, Calif. A district sales office of Columbia Chemical will be opened in San Francisco after the first of the year, in addition to the Alkali company's Los Angeles office.

Pittsburgh Plate recently also announced the plans of its subsidiary, Pittsburgh Corning Corp., to double the capacity of its Foamglas plant at Fort Allegheny, Pa., at an ultimate cost of $750,000.

## Tire Quotas Tightened; Other OPA Price Revisions

All temporary increases in manufacturers' and brand owners' ceilings for civilian replacement tires, which were to have expired December 15, 1944, will be continued in effect until April 15, 1945, according to Amendment 3 to MPR 143—Wholesale Prices for New Rubber Tires and Tubes. These temporary increases are: (1) 8.9% of the maximum retail price on passenger-car and motorcycle tires, and (2) 6.5% of the maximum retail price on all truck and bus and certain special service type tires. Amendment 3, was taken in compliance with a directive issued by James F. Byrnes, Director of War Mobilization and Reconversion, who said:

"The government is asking tire companies to expand production facilities, involving expensive changes, to meet the present critical shortage in tires for our fighting forces. The War Production Board recommended that the temporary increases in ceilings previously granted by OPA for civilian tires be continued temporarily until we have met the increased demand for heavy-duty tires. Complying with the request of WPB, I have directed OPA to continue present tire price ceilings until we have the tires necessary to meet war demands, but not later than April 15."

Mr. Byrnes concluded that continuance of existing ceiling until April 15, 1945, was necessary to aid in the effective prosecution of the war, but he advised Price Administrator Chester Bowles that should the present tire production emergency terminate before April 15, 1945, the directive would be withdrawn.

Price reductions for manufacturers and brand owners that are deferred until April 15, unless the earlier termination of the emergency permits, follow: (1) elimination of temporary price increases for passenger-car and motorcycle tires equal to 8.9% of the retail prices, and (2) elimination of a 12.5% premium for rayon construction tires, chiefly truck tires. These reductions would have applied only to civilian replacement tires and would not have affected the ceilings established for tires purchased for the Armed Forces, OPA pointed out.

December tire quotas were generally the same as those for November, and available tire supplies, particularly in the heavy-duty truck tire category, continue to fall far short of demand.

In commenting on these quotas, Max McCullough, Deputy OPA Administrator for Rationing, pointed out that despite some slightly increased quotas "little relief is in sight."

"In fact, the truck and bus tire quotas, when considered together with the present supply outlook, constitute a warning to the operators of our nation's commercial transportation system which cannot be disregarded," he said. "On November 1, a total of 90,000 truck tire applications had backlogged in our 139 emergency heavy-duty tire rationing panels for lack of quota. Instead of being able to work off some of this backlog in December, our quota, as certified by the War Production Board, will enable the panels to meet only about 60% of the estimated December needs of eligible applicants. In addition, I am advised by the Rubber Bureau of the War Production Board that an even tighter supply picture is anticipated in the spring. Demands by the military, based upon an urgent and immediate need for more truck tires to support our liberation forces, have increased sharply in the past few weeks.

"As announced publicly by Mr. Hiland G. Batcheller, WPB Operations vice chairman, the officials of both the tire industry and the government are searching every possible means to increase heavy-duty truck tire production by 25% to meet this increased military demand.

"Until this increase is accomplished, I am advised by WPB, it may be necessary to cut civilian truck tire quotas still further, despite the already critical shortage of heavy-duty tires, because of the imperative nature of the military need.

"Moreover, because the Army's lightest type of truck, the ¼-ton, 4 by 4 'jeep,' requires similar equipment for manufacture of its tires as the average passenger car, and the facilities and manpower for making both types of tire are relatively interchangeable, the production increases anticipated for passenger tires may not be realized for a time.

"If this cut in truck tire quota comes, and if expected increases in passenger car tire quotas do not materialize as quickly as we had hoped, every vehicle operator will be affected. . . . Vehicle operators must prepare now for the impending cuts. In the heavy-duty truck and bus tire field, the crisis is already here. Unless each individual commercial vehicle operator practices the utmost in tire care and conservation, particularly reduction of speed, elimination of overloads, and prompt recapping and repairing of the tires he now has, he may find his equipment immobilized for a considerable time."

Following is a tabulation of the December quotas and reserves by tire types, compared with November figures.

| Type of Tire | December Quotas: Allocated | Reserves | Total | November Quotas |
|---|---|---|---|---|
| Passenger and Motorcycle: Grade I (new tires) | 1,869,558 | 130,442 | 2,000,000 | 1,850,000 |
| Truck and Bus: Size 7.50 and smaller | 254,664 | 25,336 | 280,000 | 280,000 |
| 8.25 and larger | 96,700 | 23,300 | 120,000 | 110,000 |
| Tractor-Implement: Size 7.50 and smaller | 36,800 | 13,200 | 50,000 | 50,000 |
| Larger than 7.50 | 16,560 | 3,440 | 20,000 | 20,000 |

January quotas, which were released late last month, by their sharp decreases reflect still further the critical tire situation. Quotas follow: passenger car, 1,800,000; small truck and bus, 216,000; heavy truck and bus, 110,000; small-size tractor-implement, 50,000; large-size tractor-implement, 20,000.

James F. Clark, director of the Rubber Bureau, late in December revealed that the increased demand for military tires, occasioned by the German offensive on the West Front, had necessitated reexamination of the civilian tire program for the first quarter this year with the result that only five million passenger-car tires would be produced for civilians, against the eight million originally anticipated and the 6,650,000 produced the last quarter last year. About 350,000 military tires—small single bead, eight-ply and under—can be made instead.

Order 20 to MPR 528—Tires, Tubes, Recapping, and Repairing—sets a maximum retail price for a new 20x9x16 industrial solid tire carrying the brand name of Goodyear Supply Co., Inc., Philadelphia, Pa. The next order does likewise for a new Hard Rock Lug truck tire made by Goodyear Tire & Rubber Co., Akron, O. Order 22 establishes retail ceilings for four sizes of mud and snow type of truck tires, products of United States Rubber Co., New York, N. Y.

Used C-1 rubber tires no longer fit for Army service, to be sold by the government for civilian use, received wholesale ceiling prices by Order No. 12 under Supplementary Order 94—Sales by Government Agencies and Resales by Certain Buyers—effective December 12, 1944. These ceilings are $30 a ton, f.o.b. shipping point, on sales by the Procurement Division of the Treasury Department to manufacturers, and $40 per ton, f.o.b. destination, on sales by manufacturers to tire dealers. Tire manufacturers are expected to resell the tires to dealers, vulcanizers, and recappers for repair and resale to the public. Ceiling prices already established in the retail rubber tire regulation will apply on sales to consumers. No estimate is available as to the number of these tires to be turned over for civilian use. According to information supplied OPA by the Army, the tires come chiefly from the war fronts and are taken from various types of Army vehicles. Although no longer suitable for Army use, they may be reconditioned for limited civilian service.

Amendment 90, RO 1A—Tires, Tubes, Recapping and Camelback—effective December 4, makes several changes in the order covering such points as eligibility for emergency reserve of tires, amount of emergency reserve, grades of tires for which certificates may be issued, transfers to and from the Procurement Division of the Treasury Department, transfers of used tires by manufacturers, certificates or receipts for tires, and records of transfers.

Because of their poor quality and spotty distribution, the few used passenger-car tires still in the hands of tire dealers were removed from rationing December 5 by Amendment 91. Most of these tires are the residue of the 6,800,000 used tires purchased from motorists by the Defense Supplies Corp. two years ago. In removing used tires from rationing OPA also changed the definition of Grade I tires to include factory seconds and tires made of reclaimed rubber.

Tire ration certificates dated March 31, 1944, and earlier were invalidated by Amendment 92. Any person whose certificate is so invalidated may reapply at his local War Price and Rationing Board and reestablish his eligibility. At the same time OPA also revoked the requirement that an applicant for tires for a commercial motor vehicle present the Certificate of War Necessity he is required to hold for the vehicle at the time he applies for tires. This provision was voided because ODT has ceased to issue Certificates of War Necessity to individual vehicles in a fleet and now issues only a master certificate to cover all the vehicles. The rationing board, however, may still require proof of the existence of a valid master Certificate of War Necessity, OPA said.

#### Changes in Rubber Goods Prices

Retail ceilings for canvas-topped rubber-soled shoes made in Cuba of natural rubber and imported into the United States by retailers appear in Amendment 1 to RMPR 229—Retail and Wholesale Prices

for Certain Rubber Footwear—effective January 1, 1945. These prices will be the highest dollar-and-cent ceilings already established for retail sales of synthetic rubber canvas-topped footwear. They range from $1.55 a pair for children's footwear to $3.75 a pair for men's training shoes.

At the same time two methods were provided so that ceilings for all types of rubber footwear can be established for those wholesalers who cannot determine their maximum prices under the existing pricing provision. This provision is that listed whoesale dollar-and-cent ceilings apply, less all discounts, allowances, and any other deductions that the whoesaler had in effect between April 1 and October 25, 1941.

For purposes of clarity OPA also expressly provided that rubber footwear not specifically covered by the rubber footwear regulation will come under the General Maximum Price Regulation. Ceilings then will be at the seller's or nearest competitor's highest prices in March, 1942. 1942.

Seven groups of rubber items on which manufacturers may not adjust their own ceilings under a recent authorization appear in Amendment 1 to Order 41 under MPR 149—Mechanical Rubber Goods—effective December 27, 1944. The previous authority, effective November 18, 1944, allowed manufacturers who have substituted Buna S for natural rubber in molded and extruded mechanical rubber goods not listed in Appendix A of MPR 149 to adjust their maximum prices on these products to equal current factor costs plus cash discount. The seven groups are: brake linings and clutch facings; flooring, mats, and matting; foamed latex products; hard rubber goods; oil well specialties; rubber covered rolls; and sponge rubber goods.

Manufacturers of wet ground mica may sell on an adjustable pricing basis pending final decision by OPA regarding requests for price increases by some producers, under Order No. 8 of MPR-347—Mica—effective December 6. Present producers' ceilings for such mica are March, 1942, prices for each producer, plus $5 per ton. Some manufacturers have represented to OPA that their present operations are being conducted at a loss, and OPA is studying the situation to determine whether present ceilings are fair and equitable and whether an industry-wide increase in prices is warranted. But it will be some time before this study can be completed.

### Rubber Division Director

(*Continued from page* 445)

and cements and the syntheses of rubber. He was made technical manager of synthetic rubber in July, 1943.

Associations of which he is a member include Kappa Delta Rho, Alpha Chi Sigma, Phi Lambda Upsilon, American Chemical Society, American Institute of Chemical Engineers, and the American Association for the Advancement of Science. He likes swimming and golf and tennis and enjoys a quiet evening at home and an occasional party. Technical reading and research occupy many of his leisure hours.

Dr. Garvey is married and has two children, Eleanor, 14, and Elizabeth, 10. The Garveys live at 168 Castle Blvd., Akron, O.

# EASTERN AND SOUTHERN

### Power Show Held in New York

Apparatus for the production, control and distribution of energy was displayed by about 300 exhibitors at the Sixteenth National Exposition of Power and Mechanical Engineering at Madison Square Garden, New York, N. Y., November 27 to December 2. Equipment used in power plants and in the application of power to machinery as well as water, steam, and air to processing equipment was shown. Many displays concerned the conservation of energy within the manufacturing plant and included a large variety of indicating instruments and controls. Processing and transmission apparatus, materials handling equipment, engineering materials, and machine tools were also exhibited. Industrial lubricants were displayed by Socony-Vacuum Oil Co., Inc.; ball, swivel, and revolving joints by Barco Mfg. Co., Not Inc.; and belting and V-belts of balata, and neoprene and other synthetic rubbers by Baldwin Belting, Inc.

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**J. M. Huber, Inc.,** 460 W. 34th St., New York 1, N. Y., recently made an emergency transatlantic air shipment of several hundred pounds of Suprex clay urgently needed by a British rubber manufacturer. R. H. Eagles, vice president of the firm, said this was the first known commercial shipment of clay by air. The Suprex was loaded in the nose of a huge bomber.

**The Jefferson Chemical Co., Inc.** recently was organized jointly by American Cyanamid Co., both of 30 Rockefeller Plaza, and The Texas Co., 135 E. 42nd St., both of New York, N. Y., to manufacture and sell chemicals from petroleum. The plants to be erected will be near various large Texaco refineries. Officers of the new company follow: chairman, W. B. Bell, president of American Cyanamid; vice chairman, W. S. S. Rodgers, Texas Co. chairman; president, H. L. Derby, president of American Cyanamid Chemical Corp.; vice president and general manager, P. M. Dinkins; vice presidents, R. J. Dearborn and M. Halpern; treasurer, K. C. Towe; secretary, W. P. Sturtevant; assistant secretary and assistant treasurer, W. G. Elicker.

**Carrier Corp.,** Syracuse, N. Y., has appointed N. Stuart Irwin assistant director of advertising and sales promotion. For the past six years Mr. Irwin was with General Electric and Sherwin-Williams, engaged in advertising, promotion, and management-employe relations.

Allen K. Snyder recently rejoined Carrier Corp. as staff assistant to Les M. Beals, director of advertising and sales promotion. Mr. Snyder returns to the air conditioning and refrigeration industry from a five-year association with Dayton Rubber Mfg. Co., Dayton, O., in which he was engaged in industrial advertising and sales promotion activities in the V-belt power transmission field.

**Bruce R. Silver,** manager of technical service, New Jersey Zinc Co., 160 Front St., New York, N. Y., was elected president of the recently formed Chemical Alumni Club of New York University.

### More Rayon Tire Cord Coming

American Viscose Corp., 350 Fifth Ave., New York, N. Y., last month announced that initial production of high-strength rayon tire yarn has commenced at the new unit at its Front Royal, Va., plant. Current output is small, but is expected to increase gradually until full production is reached, probably around the middle of this year. This new unit, constructed by government order, will produce approximately 57,000,000 pounds annually of high-strength rayon tire yarn when in full operation. This amount added to the plant's previous output, will make a total production at Front Royal of approximately 82,000,000 pounds a year.

American Viscose plants at Lewistown, Pa., and Parkersburg, W. Va., have completed installing cord twisting machinery and looms for weaving rayon tire cord fabric. This equipment was installed at the request of WPB to increase the production of rayon tire fabric needed for heavy-duty tires. The Lewistown plant in June, 1944, completed conversion of a portion of its rayon yarn producing facilities to manufacture approximately 20,000,000 pounds annually of high-strength rayon for tire cord fabric. This yarn can now be twisted and woven into tire fabric by the new equipment just installed for these operations. The Parkersburg plant will obtain its high-strength yarn from the company's plants at Front Royal and Marcus Hook, Pa.

Wm. C. Appleton, president, American Viscose, recently stated United States production of rayon in 1944 will approximate 715,000,000 pounds, a new production record, compared with 663,000,000 pounds in 1943 and 633,000,000 pounds in 1942. The increase last year was due chiefly to expanded production by order of the War Production Board of high-tenacity viscose rayon yarns for use in miltary and synthetic rubber tires and self-sealing gasoline tanks and to slightly enlarged output of viscose rayon staple fiber urgently needed for civilian clothing requirements.

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**Flintkote Co.,** 30 Rockefeller Plaza, New York, N. Y., has called for redemption January 15 at $105.50 and accrued dividends 500 shares of $4.50 preferred stock.

**E. I. du Pont de Nemours & Co., Inc.,** pigments department, Wilmington, Del., has appointed Roy E. Troutman, with the company since June 1, 1936, manager of the new southern district office at 201 Main St., Houston, Tex. Warehouse facilities will be maintained as heretofore at Houston and Dallas, Tex., and at New Orleans, La. Texas, Louisiana, Mississippi, and Alabama will be served by the new office, making possible more direct service and greater technical assistance to consumers of white pigments and dry colors in that area.

Four recent appointments on the sales staff of the du Pont pigments department follow: G. A. McCorkle, assistant to F. H. Weismuller, director of sales; W. R. Morpeth, sales manager of white pigments; J. W. Cronin, sales manager, dry colors; J. A. Fredrickson, manager of the central sales district, with offices in Cleveland, O., succeeding Mr. Cronin.

## U. S. Rubber Financing

United States Rubber Co., 1230 Sixth Ave., New York 20, N. Y., last month retired all of its $29,308,000 outstanding first mortgage and collateral trust 3⅝% bonds, due July 1, 1958, through private sale of $30,000,000 10-year serial notes at 2% interest. The original issue of the first mortgage bonds, brought out July 1, 1938, was for $45,000,000. More than a score of banks throughout the country participated in this refinancing, which became effective December 27, 1944.

Final settlement with the government, covering renegotiation of war contracts for 1943, has been determined, and after application of federal income taxes such settlement amounts to $646,809.08. The income statement, as presented in the annual report for 1943, included a net provision for renegotiation, after taxes, of $1,924,700, which was, therefore, more than sufficient for the purpose. The excess provision of $1,277,890.92 is being returned to earnings at this time.

Ten consolidated actions in the Supreme Court of New York, New York County, by Arthur Diamond and others against present and former directors and officers of United States Rubber Co. have been settled with court approval. The settlement also embraces claims set forth in an action pending in the United States District Court, Southern District of New York, and in an action pending in the Supreme Court of New York, Westchester County. Terms of the settlement provide for dismissal and release of all pending claims.

### Products Developed

U. S. Rubber announced in December production of a flexible 1½-inch hydraulic synthetic rubber hose. Braided with wire and specially fabricated to withstand a powerful pressure, the hose is attached to debarking machines in pulp and paper mills. Twenty-foot logs are stripped in 30 seconds. The hose, the strongest ever built by the rubber company, was flexed a million times in laboratory tests.

U. S. Rubber is using several types of synthetic rubber latex for insulating and coating metal objects such as filter-press plates, steering wheels, and many other items. The method used, developed by the company prior to the war, does not require molds or dies. Neoprene and Buna S latices have been found to be satisfactory replacements for natural latex in the process.

Production of rayon tire cord has been started in the government's new $2,240,000 plant at Scottsville, Va., according to H. Gordon Smith, general manager of U. S. Rubber's textile division. When in full operation, the mill will have an annual capacity of 12 million pounds of twisted rayon tire cord. About 180 people are now employed, and it is expected to increase the number to 300 within the next two months. Construction of the plant started last May and completed according to schedule, was financed by the Defense Plant Corp., and the plant is operated under lease by U. S. Rubber, with O. L. Ward in charge as superintendent.

### Personnel Promoted

John Blake has been appointed manager of marine cable sales, with headquarters at 1230 Sixth Ave. Mr. Blake started with the company in 1911 at the Bristol, R. I. plant, but left in 1915 to become factory superintendent of Bishop Gutta-Percha Co. This firm was dissolved during 1941, and after being associated with another wire plant Mr. Blake returned to Bristol as subcontracting manager.

H. S. McPherson, of St. Louis, has been appointed midwestern sales manager of the mechanical goods division of U. S. Rubber, and W. M. Ballew, of Kansas City, Mo., has been shifted to the post of southwestern sales manager. Mr. Ballew will be responsible for mechanical goods sales in branch offices in Kansas City, Tulsa, Denver, Houston, Dallas, New Orleans, Omaha, and Minneapolis; while Mr. McPherson's territory includes Detroit, Cincinnati, Indianapolis, Chicago, Milwaukee, and St. Louis.

Mr. Ballew entered the mechanical goods business in Tulsa, 31 years ago, specializing in products for the oil industry. He received valuable training from his father, J. W. Ballew, a pioneer in the rubber industry, becoming well versed in the production, refining, and marketing of petroleum.

Mr. McPherson began his rubber career 33 years ago. He was in charge of mechanical goods sales in Boston from 1932 to 1935 and in St. Louis from 1935 until the present time. Prior to that he promoted mechanical goods sales in Japan, Australia, and South America.

## Calendar

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| Jan. 12. | Rubber & Plastics Division, Montreal Section, S.C.I. Ritz-Carlton Hotel, Montreal, P. Q., Canada. |
| Jan. 14-31. | March of Dimes. |
| Jan. 19-20. | American Physical Society. Annual Meeting. Columbia University, New York, N. Y. |
| Feb. 2. | Chicago Rubber Group. Morrison Hotel, Chicago, Ill. |
| Feb. 6. | Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif. |
| Feb. 9. | Rubber & Plastics Division, Montreal Section, S. C. I. Ritz-Carlton Hotel, Montreal, P. Q., Canada. |
| Feb. 26-Mar. 2. | American Society for Testing Materials. Spring Meeting. Hotel William Penn, Pittsburgh, Pa. |
| Mar. 1. | First National Products of Tomorrow Exposition. Chicago Coliseum, Chicago, Ill. |
| Mar. 6. | Los Angeles Rubber Group, Inc. Mayfair Hotel, Los Angeles, Calif. |
| Mar. 9. | Rubber & Plastics Division, Montreal Section, S. C. I. Ritz-Carlton Hotel, Montreal, P. Q., Canada. |
| Mar. 19-21. | N.A.W.M.D. War Industry Conference. Hotel Sherman, Chicago, Ill. |
| Mar. 23. | Chicago Rubber Group, Morrison Hotel, Chicago, Ill. |

### Wide Use of Rayon for Future Tires Seen

S. M. Cadwell, director of tire development, U. S. Rubber, speaking to the Charleston, W. Va. section of the American Society of Mechanical Engineers on November 20, predicted a wider use of rayon in postwar tires. Virtually all synthetic truck and bus tires will be made of rayon cord, which has improved the performance of synthetic truck tires as much as 375%, compared with tires made with cotton cord, he said. The proportion of crude and synthetic rubber used in postwar tires will depend both on price and American foreign policy, Dr. Cadwell stated. New and improved types of synthetic rubber will be developed, he also said.

Dr. Cadwell announced in December a new principle in rayon tire construction which provides stronger synthetic rubber truck tires. Known as the 2200 denier rayon type, the new development consists of using fewer, but stronger plies in the tire. The 2200 denier rayon tire has twice the number of filaments twisted together as the 1100 denier, Dr. Cadwell explained, which type was previously used. Because fewer operations are involved and materials and component parts reduced, the new construction is expected to result in increased tire production.

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**I. B. Kleinert Rubber Co.,** New York, N. Y., has announced production of a rayon fabric known as Fabulon. It is being used in three different weights and with a variety of different coatings to meet the specific needs of several types of merchandise. Its current use for dress shields, shower caps, and shower curtains will be extended later to include baby pants and other articles. Fabulon is said to be highly absorbent and is equally strong in both the wet and the dry state.

**George L. Peters, Jr.,** son of the president of Peter Bros. Rubber Co., Inc., 160 John St., Brooklyn 1, N. Y., and a laboratory technician in the rubber company before his army enlistment two years ago, sustained head and leg injuries caused by enemy bombs in the American invasion of Leyte Island in the Philippines in October. He will recover, and regain the full use of his leg.

**Darlington Fabrics Corp.** has moved its offices to new quarters, 4701 Empire State Bldg., New York 1, N. Y.

**Manhattan Rubber Mfg. Division** of Raybestos-Manhattan, Inc., Passaic, N. J., for the second year won the highest award in the National Victory Garden Institute competition, "in recognition of its distinguished record in the encouraging of Victory Gardens and more food preservation."

**National Association of Waste Material Dealers, Inc.,** 1109-12 Times Bldg., New York 18, N. Y., will hold a Waste and Secondary Raw Material War Industry Conference at the Hotel Sherman, Chicago, Ill., March 19-21. The program will be built around the slogan that the Association has carried on correspondence since 1941: "Waste Materials Can Win the War —Keep Them Moving."

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## New Polyhydric Alcohol

TRIMETHYLOLPROPANE, a polyhydric alcohol, is a crystalline waxy solid. It is used in making low viscosity drying and non-drying alkyd resins, in the manufacture of synthetic drying oils, rosin esters, coating compositions, and plasticizers. Resins made with it are said to have considerably higher stability to light than the usual ester resins from rosin and other polyhydric alcohols. In general, resins and oils made with TMP, commercially available from the Heyden Chemical Corp., are reported to show wider solvency and compatability than corresponding compounds made with other polyhydric alcohols.

# OHIO

## Texas Tire Plant Dedicated

The General Tire & Rubber Co., Akron, recently dedicated its Waco, Tex., tire plant as a part of the "Texas-in-the-War" tour for nationally known newspaper and radio reporters. Sales personnel of the tire company came from all parts of the country for the dedication. They also inspected the enlarged tire-producing facilities in the Waco plant and the synthetic rubber plant operated at Baytown, Tex., for the government. Under management of Joseph F. Sloate, the Waco plant is the first tire-building factory in the Lone Star State. It has a 200-foot frontage and a 95-foot depth, is built of reenforced concrete, and is completely air conditioned. Complete fluorescent lighting is obtained through 2,200 new industrial lamps. The full capacity will be at least 3,000 tires a day. Officials of the tire company attending the dedication included: William O'Neil, president; L. A. McQueen, vice president in charge of sales; C. J. Jahant, vice president in charge of production; W. E. Fouse, vice president and treasurer; and W. H. Mason, director of public relations.

W. H. Beardslee recently joined the engineering staff of General Tire's aviation division as project engineer in charge of aircraft wheels and brakes. He comes to General with a background of some 17 years in aviation engineering and was appointed technical advisor to the Cantonese Air Force in Canton, China.

Assignment of John E. Powers to special duties on the executive sales staff was announced last month by Mr. McQueen. After graduation from Harvard in 1925, Mr. Powers entered the rubber business in his native Massachusetts. In 1934 he came to General as territory salesman in New York and was advanced to assistant eastern division manager and then to manager of the New York branch before coming to Akron to take over his new post.

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## Goodyear Developments

The Goodyear Tire & Rubber Co., Inc., Akron, has recently shipped by Army transport plane four tons of synthetic rubber, tire fabrics, compounding chemicals, and solvents to a tire plant in Belgium. The undamaged plant captured by American forces is to be used to supply tires and recaps for the offensive. The materials shipped by air were vitally needed. A second shipment of ten carloads of tire material is on its way by fast ship.

A. F. Landefeld, manager of Goodyear's Pliofilm department, recently disclosed that "run-in" replacement cylinders for warplane engines are being shipped to battlefronts with the same moisture protection as the engines themselves. Each "run-in" cylinder package includes an indicator card visible through the Pliofilm to show at a glance when moisture inside the package has risen beyond the danger point.

All the proven principles of moisture protection will be retained in postwar packaging of mechanical products, A. B. Clunan, manager of Goodyear's Pliofilm packaging sales department, recently stated. He indicated that examples of dehydrated packaging of many postwar items will be shown at the next annual packaging show by the Goodyear Company and other manufacturers.

Two key positions in Wingfoot Homes, Inc., Goodyear subsidiary, have been filled with the appointment of Carl A. Crafts as sales manager and Leonard T. Ostergren as production manager. Mr. Crafts was formerly manager of retail stores, and Mr. Ostergren, plant superintendent of the Goodyear Aircraft Corp. plant at Newark, O.

H. Webster Crum has been appointed manager of the new products division of Goodyear Aircraft Corp., according to Harry E. Blythe, vice president and general manager. Mr. Crum, a former blimp pilot and chief engineer at Wingfoot Lake air base, was named manager of airship control in August, 1942, to coordinate with subcontractors the huge airship production schedule for the Navy. In his new post Mr. Crum will continue to head up the company's outside activities in lighter-than-air. He succeeds Ray Hudson, who goes to Detroit for the parent Goodyear company on a new assignment.

Howard C. Steiner has been appointed vice chairman of the board of The Goodyear Tyre & Rubber Co. (Australia), Ltd., Sydney, Australia, to succeed the late William G. Kither. P. W. Litchfield continues as chairman of the board. Mr. Steiner, in Australia since 1930, began his assignment there as sales director and was appointed assistant managing director in 1937 and managing director in May, 1944, following the retirement of Mr. Kither from active duty. Prior to going to Australia, Mr. Steiner spent several years in China and Japan as a special sales representative.

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## New Compounding Process for Tire Stocks

A compounding process developed to reduce the danger of heat failure of heavy-duty synthetic rubber tires was recently announced by John W. Thomas, chairman of the Firestone Tire & Rubber Co., Akron. Chemical engineers have known that the addition of zinc oxide to rubber would make tires cooler-running. No method had been found in the dry compounding of synthetic rubber to mix properly zinc oxide with the rubber and obtain the maximum increase in reenforcement. The use of the latex method of compounding zinc oxide with synthetic rubber was, therefore, one of the next obvious steps.

Latex to which zinc oxide had been added, however, still could not be made to coagulate satisfactorily. This difficulty was solved by Firestone research men through a process utilizing magnesium sulphate as the key material. A compound of equal parts of synthetic rubber latex and zinc oxide can be mixed together and coagulated easily and quickly in the magnesium sulphate process. Sufficient quantities of the stock have been produced for large-scale development and road-testing work. Heavy-duty tires of improved heat resistance using a stock of this type might afford some relief in the present critical tire shortage.

Firestone was notified last month that it had been selected for the second successive year to receive the highest award of the National Victory Garden Institute —a plaque in recognition of the company's "distinguished record in encouraging of victory gardens and home food preservation."

### Jackson and Firestone Speak

L. R. Jackson, executive vice president, at the annual meeting of American Society of Mechanical Engineers in New York, N. Y. on November 28 discussed "Distribution after the War." Mr. Jackson centered his talk about the theme, "Production Will Win the War—Selling and Distribution Will Win the Peace." He emphasized that everybody seemed to agree that the supreme problem of our postwar world will be that of keeping employment at the highest possible level to maintain purchasing power, but that we will not have jobs for all who want them unless we do the greatest selling job ever known. To do this postwar selling job we must be sure our selling effort is properly directed, Mr. Jackson said and added that after the war the goods will be available, and industry's big task will be to see to it that we are ready with distribution systems and plans geared to the biggest selling job this country has ever tackled.

The need of much work on market analysis was stressed since many of the people who make up the market—the consumers whose buying is the spark plug that starts every business going, directly or indirectly, and keeps it going—will have different incomes, live in different places, and have different jobs. Production may be more efficient than distribution, but unsold goods benefit no one. Long-range planning and long-range viewpoints are just as important in distribution as in product and production activities, and this phase of distribution now and after the war should have alert and aggressive leadership from management, Mr. Jackson declared.

Harvey S. Firestone, Jr., president of the Firestone company, speaking at the Economic Club of New York, December 5, on "The Outlook for Postwar Industry," discussed future problems in production and distribution. The tire industry and some others, he said, can begin turning out civilian products within 24 hours after government permission is given. He cited examples showing, however, that reconversion will not be uniform, and this fact, Mr. Firestone stated, will result in a number of economic and sociological problems. In conclusion he declared that the outlook for postwar industry is largely up to industry itself and that American industry will accept the challenge of the problems of the future.

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## Goodrich Appointments

J. E. Thomas recently was named manager of cement sales in the industrial products sales division of The B. F. Goodrich Co., Akron. He will direct the sale of all adhesive materials handled by the division. He came to Goodrich in 1930 and for the last three years had been engaged in work on war contracts.

To provide more effective sales management and control in the Goodrich tire replacement division, the nation has been divided into four areas, and a division manager named for each: Wilson C. Bray, eastern; John F. Moser, southern; Charles A. McGill, central; and Frank E. Titus, Pacific Coast. The new division managers will have complete responsibility for the sales of tires, tubes, batteries, heaters, and other auto and home products in their areas. They will direct sales activity

among dealers as well as the operations of company-owned stores and recap plants.

Mr. Bray, with Goodrich since 1918, had been manager of the truck and bus tire department and assistant manager of tire sales. Mr. Titus has been with the company since 1907 and in charge of sales activities on the Pacific Coast since 1928. Mr. McGill and Mr. Moser joined Goodrich in 1922. The former had been manager of the Kansas City district since 1934; while Mr. Moser had been New Orleans district manager 10 years. Succeeding Mr. McGill at Kansas City is W. A. Olson, transferred from the Omaha district, where he had been district manager since 1939. His successor is Burt Meyers, store supervisor in the Omaha district.

John T. Staker, manager of the tire conservation department, has been named Pacific Coast manager of the company's international division, with headquarters in San Francisco, Calif. Mr. Staker, with Goodrich since 1928, has been special representative of the mileage contracts department and was assistant department head until 1938 when he became manager of the fleet sales division. In 1942 he devised a plan of tire conservation based on a consultant service for truck and bus fleets and defense plant car operators and was directing this activity at the time of his appointment to the export field.

Robert P. Kenney, chief of the vinyl resins unit of the WPB Chemicals Bureau, was named manager of international service of the Goodrich chemical division. His immediate responsibilities consist of giving technical assistance to foreign users of war-purpose materials produced by the division. He served the War Production Board for the last three years and previously had been chief factory chemist at the Savannah, Ga., plant of Union Bag & Paper Corp., and before that a chemist with Archer, Daniels, Midland Co., Minneapolis, Minn. He received his degree in chemistry from Dartmouth.

Howard E. Fritz, director of research at Goodrich, addressed the John Deere Organization, Moline, Ill., recently. Speaking on "The Conflict That Never Ends: Nature *versus* Research," he described new products made available in the past 25 years through research and also several new materials developed as the result of the current war. Production of synthetic rubber was described.

### New Products Developed

Goodrich recently announced a line of lightweight laboratory and industrial aprons fashioned of high-grade cotton fabric and a vinyl resin coating, said to make the aprons waterproof, acid proof, alkali proof, and oil and grease resistant. The aprons are flexible, constructed with hemmed edges, reenforced neck and waist tapes, and come in two sizes, 35 inches wide by 45 inches long, and 29 inches wide by 35 inches long. They are recommended for operations in laboratories, battery shops, metal platers, dairies, tanneries, canneries, machine shops and on the farm.

J. A. Hoban, merchandise manager, Goodrich tire division, recently announced production of a passenger-car tire with a button-bar tread designed to impart maximum traction on slippery, snowbound highways and rutted, mud-clogged side roads and yet roll smoothly on hard improved highways on either front or rear wheels. The tire is made in both four- and six-ply types in the 6.00 by 16 size.

**New Goodrich Silvertown Mud-Snow Tire**

It is also produced in two other sizes, one is four-ply, the other is six-ply.

An announcement by the Goodrich aeronautical division of the adaptation of Flexlock rubber couplings to aviation uses suggests the application of these couplings where vibration might cause metal-to-metal couplings to fail. For aeronautical uses the Flexlock couplings can be made of either natural or synthetic rubber, depending upon service conditions. Various compounds have heat ranges from —50° F. to 150° F. and can be made resistant to petroleum products and aromatics, as well as hot and cold gases and liquids; the latter includes commercial acids, alcohols, water, gasoline, and oil. Present applications are as high-pressure grommet seals, for passing lines into or through liquid containers such as integral fuel tanks, and as a flexible joint for wiring or control cable conduits.

L. E. Rohrbaugh, manager of the Goodrich shoe products sales division, recently announced Koroseal shoe soling and Koroseal toplifts for women's shoes. Extensive tests reportedly prove that the soling will not crack at any temperature range and will wear from two to three times as long as the best leather or rubber soling now being used commercially. The solings and the toplifts are said to be non-marking and impervious to water, oil, and grease. More flexible than leather, they will grip as well as leather and rubber soling, even in wet weather, and can be cleaned easily with a damp cloth. The new solings and toplifts are 15 to 20% lighter in weight than comparable sizes in leather or rubber. The soling can be applied to the shoe by any method now used for attaching leather or rubber. Toplifts can be slugged on in the usual manner.

A new adhesive was developed for fastening the Koroseal soling with toplifts to shoes, allowing them to be securely attached to all surfaces. Composition of the cement, which withstands a pull of 12 to 15 pounds to the linear inch, was not revealed.

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**Tanney-Costello Co.**, dealer in scrap rubber, Akron 9, has opened a branch office at 70 Wall St., New York 5, N. Y., under the management of Robert J. Heiney. The telephone number is WHitehall 4-8438.

**American Zinc Sales Co.** and **American Zinc Oxide Co.**, both wholly owned subsidiaries of American Zinc, Lead & Smelting Co., have elected Alwin C. Eide a vice president of both companies. His headquarters are at Columbus.

**The C. P. Hall Co.**, Akron, O., has opened a new office and warehouse at 5700 W. 67th St., Chicago 38, Ill.

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# MIDWEST

## Monsanto Promotions

Monsanto Chemical Co., St. Louis, Mo., last month disclosed that "Vuepak," a transparent sheet plastic formerly used to package orchids and other luxury items, is now protecting the eyes of millions of members of the armed forces against wind, sand, dust, and glare. The cellulose acetate eyeshields, issued by the Chemical Warfare Service, were primarily designed to safeguard the wearer against blister gas sprayed from airplanes. When gas warfare failed to materialize, G.I. Joe quickly found other uses.

David L. Eynon, Jr., plant manager of the Longhorn Ordnance Works, which Monsanto Chemical operates for the government at Karnack, Tex., has been promoted to assistant to the genaral manager of the company's organic chemicals division. Among his other duties he will continue to be responsible for all Monsanto operations at Karnack, where a new $8,000,000 ordnance plant is being constructed, adjoining the Longhorn Ordnance Works. Robert K. Mueller, general superintendent of production at Karnack, has been named to succeed Mr. Eynon and is in turn succeeded by Robert M. Morris, maintenance superintendent at Karnack.

Franklin D. Smith has been made assistant director of development for Monsanto's organic chemicals division. Dr. Smith received his Ph.D. from the University of Michigan in 1929, taught high school a year, and entered Monsanto's service as a research chemist at St. Louis in 1930. He became a member of the company's technical service department staff in 1932 and has been in the divisional development department since September, 1943, specializing in organic chemical problems.

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## Products Fair Scheduled

The First National Products of Tomorrow Exposition, a display of new products that will go on the market in the immediate postwar period, will be opened to the public about March 1 at the Chicago Coliseum, Chicago, Ill. Exhibitors will include many concerns known for their research activities as well as others which plan to enter new fields of production. Thousands of articles including inventions developed during the war and old products revolutionized in style and utility will be shown. Patterned after the Leipzig Fair, famous exposition of pre-Hitler Germany where many of the world's large firms exhibited the latest developments of their products, the show will run for two weeks.

### Alumina Development Laboratory Opened

The formal opening of a new alumina development laboratory of Aluminum Research Laboratories, Aluminum Ore Co., a subsidiary of Aluminum Co. of America, was held December 14 at the East St. Louis, Ill., works of the corporation. The development laboratory was built at a cost of $750,000 to provide pilot-plant capacity equipment primarily for the development of improved operating technique, economy in use of materials, and improved quality of product in the Alcoa combination process for the extraction of alumina from low-grade bauxites.

The building is of brick and steel construction. It is 80 feet wide by 14 feet long and has two mezzanines, giving a total of 46,300 square feet of floor space. The machinery reflects on a small scale the equipment actually used in the new combination process. The equipment is so arranged that it can be connected into complete layouts for any alkaline digester or sinter process, or combination of these processes, to handle any type of raw material. The development laboratory is expected to be of considerable benefit to the national security by helping improve and develop methods of extracting alumina from materials not now usable, thus expanding United States reserves by millions of tons.

# NEW ENGLAND

### Cabot Executive

Directors for 1944-45 of the Division of Rubber Chemistry, American Chemical Society, include Fred H. Amon, technical director of Godfrey L. Cabot, Inc., 77 Franklin St., Boston, Mass., and assistant to R. G. Allen, vice president in charge of carbon black production, sales, and development. Mr. Amon's first employment was with The B. F. Goodrich Co., Akron, O., in 1917. His association with that company extended over a period of 12 years and included work in chemical research, raw materials inspection and development, and mechanical goods and tire compounding. He was also technical manager of the processing division. In 1930 he joined the management staff of Godfrey L. Cabot, Inc.

*Waid Studio*

**F. H. Amon**

Born in Greenville, Pa., Mr. Amon received the degree of Bachelor of Science in chemistry in 1916 from Allegheny College. In 1917 he obtained a Master of Science degree. Mr. Amon is married and has two sons. His home is at 13 Maple Rd., Weston, Mass.

He is a member of the New York Academy of Sciences, The Chemists' Club (New York), the American Institute of Chemical Engineering, and the American Association for the Advancement of Science. His hobby is photography, and he is an active member of the Boston Camera Club. Mr. Amon has served the Division of Rubber Chemistry of the A. C. S. in the past as a director and as a member of the planning committee. He is the co-author of many technical papers dealing with the chemistry of rubber and carbon blacks.

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**Farrel-Birmingham Co., Inc.,** has adopted a retirement pension plan for the employes of its three plants at Ansonia and Derby, both in Conn., and Buffalo, N. Y. The plan has met with ready acceptance by the employes; 97% of the 968 initially eligible have signed up for membership. The plan, effective from January 1, 1944, is designed to provide retirement income to supplement the old age benefits of the Federal Social Security Act. The company is undertaking to finance all the pension benefits for past service as called for in the plan, as well as the entire cost for the year 1944. With respect to future service, the plan is a cooperative effort, and the retirement fund will be built up from the combined contributions of employes and the company. Permanent employees, absent on duty with the Armed Forces during the present war, receive credit for eligibility. A pension committee has been appointed by the board of directors of the company to administer the provisions of the plan. The Central Hanover Bank & Trust Co. of New York, trustee, will hold the contributions made by the employes and the company in a trust fund, which may be invested only in securities which are legal investments for life insurance companies under the laws of the State of New York.

**The Armstrong Rubber Co.,** manufacturer of automobile tires and tubes, West Haven 16, Conn., has appointed Roy J. Neeley and Wm. J. Golden production managers of the aircraft and the tire divisions, respectively. Mr. Golden has spent more than 40 years with the Fisk division of United States Rubber Co. at Chicopee Falls, Mass.

**The Norwalk Tire & Rubber Co.,** Norwalk, Conn., has announced the return of George D. Kratz as vice president in charge of rubber development. Mr. Kratz was chemist for the company from 1914-1917 and left to become chief chemist and superintendent for the Falls Rubber Co., Akron, O. He later was its president until 1929. He then became a general consultant on latex and rubber and in 1934 became associated with General Latex & Chemical Corp., Cambridge, Mass. In 1942, Mr. Kratz joined the United States Department of Agriculture in the Eastern Regional Research Laboratory, Wyndmoor, Pa., on natural rubber research and was called later to Washington, where he served Rubber Reserve Co. in the rubber department on synthetic rubber production.

*Tenschert Photo Co.*

**George D. Kratz**

**Godfrey L. Cabot, Inc.,** 77 Franklin St., Boston, Mass., last month announced that its subsidiary, Cabot Carbon Co., would purchase the plant and facilities of the Retort Chemical Co., Gainesville, Fla. The Boston headquarters of Godfrey L. Cabot, Inc., will act as selling agent for all Retort Chemical products to the rubber, paint, varnish, plastics, rope, cordage, and other industries. No immediate plans for increasing the production of the pine tar, turpentine, charcoal, and miscellaneous wood products were announced, but it is understood that Cabot policy would be to increase capacity as demands warrant.

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# CANADA

**The Chemical Institute of Canada** will grant membership, without payment of fee, to all personnel of the Armed Forces who apply, it was announced November 14, following a two-day directors' meeting in Quebec. The special form of membership will continue for one year after demobilization.

**A new Canadian order** permits manufacturers to use synthetic rubber instead of natural rubber in the manufacture of elastic fabrics provided that the weight of synthetic elastic thread used in each yard of fabric produced is not less than the weight of natural rubber elastic thread used in a yard of the same type of fabric sold in the basic period September 15-October 11, 1941. It is further provided that the maximum price at which the fabrics are sold must be the highest price at which the same types of fabrics containing natural rubber elastic thread were sold during the above basic period.

**The Timken Roller Bearing Co., Ltd.,** subsidiary of The Timken Roller Bearing Co., Canton, O., will erect at St. Thomas, Ont., a new bearing and rock bit plant. The company, which has maintained a sales office and warehouse in Toronto, Ont., for many years, decided upon opening a plant in the Dominion because of the increased demand there for Timken products.

**C. D. Howe,** Minister of Munitions and Supply, speaking in the House of Commons, Ottawa, Ont., on December 7 said that Canada has contributed some tires for United States military vehicles. Mr. Howe also declared that the general Canadian tire contribution to the United Nations' war effort had been "material." He added that military vehicles produced in Canada represented a considerable part of allied requirements.

**B. F. Goodrich Rubber Co. of Canada, Ltd.,** Kitchener, Ont., will begin immediate expansion of its local plant and production facilities, involving an expenditure of more than $1,000,000, according to President George W. Sawin. The program will include construction of a three-story addition to the present plant and the installation of new equipment for manufacturing tires, tubes, and other products. Additional personnel, which may approximate 20% will be required to operate the plant on completion, said Mr. Sawin. He further declared that while the company's volume of war materials will be increased as a result of the expansion program, the project is not war-inspired. He said that Goodrich is looking forward to postwar markets and to resuming the manufacture of products for peacetime use. For instance, the Kitchener plant will manufacture farm service tires for the first time, in addition to other rubber products not previously made in Canada.

**E. R. Rowzee,** manager Canadian Synthetic Rubber Co., has been appointed director of synthetic rubber research for Polymer Corp., Sarnia, Ont., and has been succeeded as manager by C. H. Madsen, formerly factory manager. Mr. Rowzee was honored by employes of Canadian Synthetic at a banquet at the Sarnia Golf Club on November 28, at which he was presented with a desk set and a bound volume containing sketches of his activities in connection with the development of the synthetic rubber industry in Sarnia. At the head table, along with Mr. Rowzee, were Mr. Madsen; W. J. Barge, production superintendent; A. J. Ballentyne, secretary-treasurer; N. Fodor, mechanical engineer; R. D. Hill, chief chemist; and G. Hunt, employes' representative.

**Dunlop Tire & Rubber Goods Co., Ltd.,** Toronto, Ont., last month in declaring dividends stated that as a large number of common shares are held in Great Britain, after due consideration of the financial position of the company the common dividend was increased over previous years at the instance of the Canadian Exchange Authorities. The Foreign Exchange Control Board has pointed out to the company that such action would increase the amount of purchasing power available here to the United Kingdom, thus reducing the British deficit of Canadian dollars to be financed from such sources as Mutual Aid.

**Western Ontario Chemical Association** met November 30 in Sarnia, Ont., to hear R. D. Heidenreich, research physicist, Dow Chemical Co., Midland, Mich., U. S. A., who was introduced by G. Hemmerick, general manager, Dow Chemical of Canada, Ltd., describe how the electron microscope is used to study synthetic rubber components. Grant Messer, vice president of the Association, who acted as chairman, pointed out to the 140 chemists and chemical engineers present that this meeting was the last under the W. O. C. A. banner since the organization becomes a branch of the recently formed Chemical Institute of Canada as of January 1, 1945.

**Dominion Rubber Co., Ltd.,** Montreal, P. Q., has appointed George Bergeron, formerly director of government sales, general manager of its central division, with headquarters in Toronto, Ont., where he will coordinate the sales of tires, footwear, and mechanical goods in the division's territory.

**Goodyear Tire & Rubber Co. of Canada, Ltd.,** New Toronto, Ont., plans construction of an office building and warehouse in Quebec, P. Q. The one-story and basement building at the corner of Dorchester and Lalemant Sts. will have a 65-foot frontage and a depth of 133 feet. The estimated cost of the steel and masonite structure is $85,000.

# OBITUARY

### Wm. G. Kither

WILLIAM G. KITHER, 64, vice chairman of the board and former managing director of Goodyear Tire & Rubber Co. of Australia, (Ltd.), died of a heart attack there late in November. He had joined the company in 1916 as an operating clerk in the Adelaide branch and two years later was made its manager. Then in 1921 he became manager of Goodyear-Australia with headquarters in Sydney and was named managing director of the newly organized company in 1926. Mr. Kither retired from active duty May 1, 1944, because of ill health, but retained his position as vice chairman.

His wife survives him.

### Robert R. Drake

ROBERT R. DRAKE, service manager of the Corduroy Rubber Co., Grand Rapids, Mich., for the past 17 years, died December 8 in Grand Rapids following a heart attack. He was born in Akron, O., in October, 1878. Mr. Drake began his career in the tire industry as service manager for the Diamond Rubber Co., Akron, in 1902 and was employed in the same capacity by the Continental Rubber Co., from 1908 to 1912 and by United States Rubber Co. from 1912 to 1927.

Mr. Drake was a member of the New York Athletic Club, Kismet Temple, A.A.O.N.M.S., and the Peninsula Club of Grand Rapids.

Funeral services and interment were in Grand Rapids, December 11.

A wife and a sister survive.

### Walter H. Juve

WALTER H. JUVE, intrnationally known consulting technologist to the rubber industry, died December 13 in Washington, D. C., following a heart attack. Mr. Juve was a resident of Akron, O., where he acted as a consultant to several rubber companies. He was also a part-time consultant for the WPB mechanical rubber goods division, with which he had been connected since the early days of the war.

The deceased was born in Tacoma, Wash., in 1890 and was graduated from the University of Wisconsin in 1913. From that year until 1930 he was associated with The B. F. Goodrich Co., Akron. After a year as works chemist he was added to the staff of the development department. In later years he headed the compounding, development, construction, and process engineering departments of the Goodrich mechanical division and the development and compounding departments of the tire division. Many patents on mechanical goods, golf balls, and hard rubber products were granted to Mr. Juve and assigned to the Goodrich company. In 1930 he established himself as a consulting rubber technologist with offices in Akron. In 1934 he was president of the Akron Golf Ball Thread, Inc.

Mr. Juve was a contributor of technical articles on rubber to several scientific magazines. He had visited Germany's synthetic rubber plants before the war and was considered an authority in that field.

He was a member of the Division of Rubber Chemistry, American Chemical Society; the American Society for Testing Materials; and Masonic Blue Lodge, Chapter and Council.

Burial was in Akron.

Surviving are a wife, two sons, and a daughter.

### Hugh T. Keating

HUGH THOMAS KEATING, a partner in Harold W. French Co., crude rubber brokerage, 347 Madison Ave., New York, N. Y., died November 24 of a heart attack in Whitestone, L. I., N. Y. He was born December 18, 1888, at Ogdensburg, N. Y., and educated at St. Mary's Academy.

From 1906 to 1915 he worked for W. R. Grace & Co., New York. Then for the next year Mr. Keating operated an office in Akron, O., and acted as rubber agent for the Grace company. In 1916, however, he became manager of the firm's office in London, England. He resigned this position in 1922 and entered a partnership in a commodities concern, from which he withdrew in 1923. Then in 1924, Mr. Keating became associated with the French company. During 1930-31 the deceased was with the crude rubber house of L. W. Dumont & Co., but returned to the French organization in 1931 and served as its vice president until 1942. He was admitted to the New York Rubber Exchange in 1928.

A requiem mass was celebrated at St. Luke's Church, Whitestone, November 27, and burial was in Mt. St. Mary's Cemetery, Flushing, L. I., N. Y.

Surviving are the widow, a sister, and a brother.

**Walter Ivan Lyon,** retired secretary and treasurer of the Goodyear Rubber Co., died December 3 at his home in Los Angeles, Calif. He is survived by his wife, three sons, and a daughter.

# FINANCIAL

**American Cyanamid Co.,** New York, N. Y., and subsidiaries. First nine months, 1944: net income, $4,173,918, equal, after preferred dividends, to $1.33 a common share, against $4,297,784, or $1.45 a share, in the 1943 months; provision for renegotiation and income taxes, $10,500,000, against $13,191,446.

**American Zinc, Lead, and Smelting Co.,** Columbus, O., and wholly owned subsidiaries. First nine months, 1944: net profit, $527,943, equal to 40c a common share, against $531,271, or 41c a share, in the like period a year earlier.

**Anaconda Wire & Cable Co.,** New York, N. Y. Nine months to September 30: net profit, $922,770, equal to $2.19 each on 421,981 outstanding shares.

**Baldwin Locomotive Works,** Philadelphia, Pa. For 1943: consolidated net income, after war contract renegotiation, $4,840,157, equal, after preferred dividends, to $3.67 each on 1,274,152 common shares outstanding, compared with $4,516,344, or $4.23 a common share in 1942; sales, $221,545,903, against $167,259,141.

**Barber Asphalt Corp.,** Barber, N. J. First nine months, 1944: net profit, $604,298, equal to $1.55 a share, against $407,434, or $1.04 a share in the 1943 period.

**Boston Woven Hose & Rubber Co.,** Cambridge, Mass. Year ended August 31, 1944: net income, $341,893, equal to $3.45 a common share, compared with $365,878, or $3.73 a share, in the preceding fiscal year; gross sales, $9,792,382, against $10,750,878; reserve for contingencies, $75,000, against $100,000; taxes, $479,160, against $497,277; current assets, $5,243,345, against $5,355,195; current liabilities, $763,593, against $986,064.

**Columbian Carbon Co.,** New York, N. Y., and subsidiaries. Nine months ended September 30: consolidated net earnings: $2,315,426, equal to $4.31 a capital share, against $2,022,219, or $3.76 a share, in the first nine months of 1943; sales, $17,190,133, against $15,095,735.

**Crown Cork & Seal Co., Inc.,** Baltimore, Md., and wholly owned domestic subsidiaries. Nine months to September 30: net profit, $1,796,218, or $2.74 a common share, against $1,137,096, or $1.46 a common share, a year ago; net sales, $47,570,770, against $40,363,082.

**Dayton Rubber Mfg. Co.,** Dayton, O., Year ended October 31, 1944: net income, $781,716, equal, after preferred dividends, to $3.90 a common share, contrasted with $620,622, or $2.99 a share, in the preceding fiscal year; net sales, $20,094,000, a record, and 12.3% above the previous year's figures.

**E. I. du Pont de Nemours & Co., Inc.,** Wilmington, Del. First nine months: net sales, $463,824,121 (a record), contrasted with $427,189,325 (the previous high) in the nine months to September 30, 1943: net income, $57,805,329, equal, after preferred dividends, to $4.69 each on 11,109,689 outstanding common shares, compared with $44,489,789, or $3.49 a share; provision for federal income taxes, $91,848,000, against $95,440,000.

**Eagle-Picher Lead Co.,** Cincinnati, O., and subsidiaries. Nine months ended August 31, 1944; net income, $1,495,038, or $1.65 a common share, against $1,937,295, or $2.15 a share, in the same period of 1943.

**Electric Hose & Rubber Co.,** Wilmington, Del. Year ended August 31, 1944: net profit, $144,199, against $121,979 in the previous fiscal year.

**Firestone Tire & Rubber Co.,** Akron, O. Year ended October 31, 1944: net sales, $651,410,411 (a record), contrasted with $545,389,601 in the preceding fiscal year; net profit, after all charges, $16,310,846 (the company's highest), equal to $7.34 a common share, compared with $15,183,383, or $6.90 a share; reserve for contingencies, $2,500,000; taxes, $36,850,000, against $37,450,000.

**Flintkote Co.,** New York, N. Y. Forty weeks to October 7: consolidated net income, $1,159,163, equal to $1.09 a common share, against $874,080, or $1.04 a share, in the same period a year earlier.

**General Cable Corp.,** New York, N. Y. Nine months to September 30: net income, $1,700,232, against $1,609,150 in 1943; federal income taxes, $8,050,000, against $6,575,000.

**General Electric Co.,** Schenectady, N. Y. First nine months, 1944: net profit, $31,705,839, equal to $1.10 each a common share, contrasted with $31,433,933 or $1.09 a share, in the like period of 1943; orders received, $1,094,199,000, against $1,199,904,000; net sales billed, $1,036,634,375, against $980,226,836; provision for federal income and excess profits taxes, $141,000,000, against $201,000,000; reserve for contingencies and postwar adjustments, $12,500,000, against $18,500,000.

**Midwest Rubber Reclaiming Co.,** East St. Louis, Ill. Year ended October 31, 1944: net income, $352,688, or $2.63 a common share, against $390,128, or $2.93 a share, in the preceding 12 months.

**Monsanto Chemical Co.,** St. Louis, Mo., and subsidiaries. Nine months to September 30: net income, $3,574,156, equal to $2.32 a common share, against $4,107,906, or $2.77 a share, in the corresponding months of 1943; net sales, $63,334,803, against $61,224,282.

**New Jersey Zinc Co.,** New York, N. Y. First nine months, 1944: net profit, $3,997,664, equal to $2.04 each on 1,960,000 shares of stock, against $2.03 a share in the comparable period of 1943.

**Phillips Petroleum Co.,** Bartlesville, Okla. First nine months, 1944: net income, $14,997,363, or $3.05 each on 4,916,987 capital shares outstanding, contrasted with $10,939,171, or $2.38 a share, in the first nine months of 1943; federal income taxes, $8,425,644, against $9,480,000.

**Pittsburgh Plate Glass Co.,** Pittsburgh, Pa. First three quarters, 1944: net income, $9,963,000, equal to $4.51 a share, contrasted with $8,732,000, or $3.95 a share, in the same period a year ago.

**Raybestos-Manhattan, Inc.,** Passaic, N. J., and domestic subsidiaries. First three quarters, 1944: net profit, $1,307,628, equal to $2.08 a share, contrasted with $1,279,239, or $2.04 a share, in the like period of 1943; taxes, $5,504,000, against $5,005,000; provision for postwar adjustments and contingencies, $730,000, against $575,000.

## Dividends Declared

| Company | Stock | Rate | Payable | Stock of Record |
|---|---|---|---|---|
| American Hard Rubber Co. | Pfd. | $1.75 q. | Dec. 21 | Dec. 11 |
| American Hard Rubber Co. | Com. | 0.25 | Dec. 21 | Dec. 11 |
| Anaconda Wire & Cable Co. | Com. | 0.25 | Dec. 18 | Dec. 8 |
| Canadian Tire, Ltd. | Com. | 0.20 initial | Dec. 1 | Nov. 20 |
| Collyer Insulated Wire Co. | Com. | 0.50 | Jan. 2 | Dec. 22 |
| Crown Cork International Corp. | "A" | 0.30 accum. | Jan. 2 | Dec. 15 |
| Detroit Gasket & Mfg. Co. | Com. | 0.25 | Jan. 25 | Jan. 13 |
| Dewey & Almy Chemical Co. | Com. | 2% | Dec. 20 | Nov. 30 |
| Dewey & Almy Chemical Co. | Com. | 0.25 q. | Dec. 15 | Nov. 30 |
| Dewey & Almy Chemical Co. | "B" | 0.25 q. | Dec. 15 | Nov. 30 |
| E. I. du Pont de Nemours & Co., Inc. | Pfd. | 1.125 q. | Jan. 25 | Jan. 10 |
| E. I. du Pont de Nemours & Co., Inc. | Com. | 1.50 yr. end | Dec. 14 | Nov. 27 |
| Dunlop Tire & Rubber Goods Co., Ltd. | 5% Cum. 1st Pfd. | 0.625 s. | Dec. 30 | Dec. 15 |
| Dunlop Tire & Rubber Goods Co., Ltd. | Com. | 1.25 yr. end | Dec. 21 | Dec. 15 |
| Faultless Rubber Co. | Com. | 0.50 yr. end | Jan. 1 | Dec. 15 |
| Firestone Tire & Rubber Co. | Com. | 0.50 incr. | Jan. 20 | Jan. 5 |
| Garlock Packing Co. | Com. | 0.50 q. | Dec. 28 | Dec. 16 |
| General Electric Co. | Com. | 0.35 yr. end | Jan. 25 | Dec. 22 |
| General Tire & Rubber Co. | Com. | 0.50 yr. end | Dec. 29 | Dec. 26 |
| Intercontinental Rubber Co. | Com. | 0.35 yr. end | Dec. 23 | Dec. 16 |
| Jenkins Bros. | Pfd. | 1.75 q. | Dec. 28 | Dec. 15 |
| Jenkins Bros. | Com. | 1.00 yr. end | Dec. 28 | Dec. 15 |
| Jenkins Bros. | N. V. | 0.25 | Dec. 28 | Dec. 15 |
| Lee Rubber & Tire Corp. | Com. | 0.50 extra | Feb. 1 | Jan. 15 |
| Lee Rubber & Tire Corp. | Com. | 0.50 q. | Feb. 1 | Jan. 15 |
| Mansfield Tire & Rubber Co. | $1.20 Pfd. | 0.30 q. | Jan. 2 | Dec. 15 |
| Midwest Rubber Reclaiming Co. | $4 Pfd. (np) | 1.00 q. | Dec. 1 | Nov. 20 |
| Minnesota Mining & Mfg. Co. | Com. | 0.35 yr. end | Dec. 10 | Dec. 2 |
| Pharis Tire & Rubber Co. | Com. | 0.15 q. | Jan. 10 | Dec. 27 |
| Rome Cable Corp. | Com. | 0.15 q. | Dec. 28 | Dec. 7 |
| Seiberling Rubber Co. | Com. | 0.25 | Jan. 1 | Dec. 15 |
| Seiberling Rubber Co. | Pfd. | 0.62 q. | Jan. 1 | Dec. 15 |
| Seiberling Rubber Co. | Pfd. "A" | 1.25 q. | Jan. 1 | Dec. 15 |
| Thermoid Co. | Pfd. | 0.75 q. | Dec. 15 | Dec. 5 |
| Thermoid Co. | Com. | 0.10 q. | Dec. 15 | Dec. 5 |
| Thermoid Co. | Com. | 0.15 extra | Dec. 15 | Dec. 5 |

**Hercules Powder Co.**, Wilmington, Del. First nine months, 1944: net earnings, $3,527,948, equal, after preferred dividends, to $2.38 each, on 1,316,710 common shares, contrasted with $4,223,270, or $2.91 a common share, in the 1943 period, federal taxes $8,755,469, against $14,334,607; reserve for contingencies, $200,000, against $950,000; net sales, $79,043,042, against $91,940,775.

**Norwalk Tire & Rubber Co.**, Norwalk, Conn. Year ended September 30, 1944: net profit, $156,142, or 62c a common share, against $162,165, or 65c a share, in the preceding 12 months.

**Pharis Tire & Rubber Co.**, Newark, O., and subsidiaries. Year ended October 31, 1944: net profit, $412,660, or $1.96 each on 210,000 shares, contrasted with $209,991, or 95c each on 220,000 shares, in the previous fiscal year; net sales, $11,830,519, against $8,443,815. Report includes operations of the Carlisle Tire & Rubber Co., Carlisle, Pa., for the first ten months of 1944, and its net profit prior to date of acquisition, March 1, 1944, has been eliminated from consolidated earnings.

**Rome Cable Corp.**, Rome, N. Y. Six months to September 30: net profit, $258,622, or $1.36 a share, against $301,043, or $1.58 a share, in the '43 months; taxes, $1,147,300, against $793,660.

**Skelly Oil Co.**, Kansas City, Mo., and subsidiaries. Nine months ended September 30: net income, $5,280,669, or $5.38 each on 981,438 common shares, compared with $3,864,574, or $3.93 a share, in the like period of 1943; taxes, $5,806,500, against $4,168,800.

**Thermoid Co.**, Trenton, N. J., and subsidiaries. First nine months, 1944: net profit, $581,180, equal to 86c each on 600,000 common shares, compared with $535,623, or 98c each on 475,000 common shares, a year earlier.

**Timken Roller Bearing Co.**, Canton, O. Nine months ended September 30: net income, $4,611,926, equal to $1.90 a share of outstanding stock, contrasted with $4,912,525, or $2.02 a share, in the 1943 months.

**United Carbon Co.**, Charleston, W. Va., and subsidiaries. Nine months to September 30: net profit, $1,489,724, equal to $3.74 a share, against $1,340,590, or $3.37 a share, a year earlier.

**S. S. White Dental Mfg. Co.**, Philadelphia, Pa., and subsidiaries. First nine months, 1944: net profit, $519,481, equal to $1.74 a share, compared with $527,657, or $1.77 a share, in the corresponding period of 1943; net sales, $12,678,630, against $12,648,986.

**Baldwin Locomotive Works**, Philadelphia, Pa. Year ended September 30: net profit, $4,697,862, equal to $3.55 each on 1,278,719 common shares.

## Rubber Division Officer

Walter William Vogt, present vice chairman of the Division of Rubber Chemistry, American Chemical Society, is development manager of the tire and chemical division, Goodyear Tire & Rubber Co., Akron, O. His association with Goodyear began in 1917 after he was graduated from Oberlin College with a Bachelor of Arts degree. Mr. Vogt started in the analytical laboratories and then transferred to the research department, where he worked for several years on the physical properties of rubber, compounding, and the development of testing methods. In 1928 he became chief compounder in the tire division. Several years later his duties were enlarged to include the supervision of mechanical goods compounding and the chemical engineering activities of the company. In 1943 he was promoted to his present position.

Besides authoring papers on various rubber subjects for trade and technical publications, Mr. Vogt contributed a chapter on "Physics of Vulcanized Rubber" in "Chemistry and Technology of Rubber," edited by C. C. Davis and J. T. Blake and published in 1937.

In 1938, Mr. Vogt spent six months on a tour of Goodyear plants in Australia, Java, Sumatra, and England. He also visited India, Italy, Germany, and France to study rubber processing and development in those countries.

He is also a member of the Society of Automotive Engineers.

Mr. Vogt was born in Clyde, O., April 5, 1896.

He was married in 1920 and has a daughter. The Vogt resident is at 189 Pasadena Ave., Akron.

Walter W. Vogt

## Maynard F. Torrence

Elected for the 1944-45 term as sergeant-at-arms of the Division of Rubber Chemistry, American Chemical Society, Maynard F. Torrence is division head in charge of tire development at the rubber laboratory of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

Born in Murray, Utah, in 1905 and educated in the public schools there and at Butte, Mont., Mr. Torrence graduated with a B.A. in chemistry from the University of Montana, in 1927. Now living in Woodstown, N. J., he is married and has three children.

After a few months' research on flotation agents for Nevada Consolidated Copper Co., Mr. Torrence accepted employment in the general laboratories of The B. F. Goodrich Co., Akron, O., in 1927. He worked successively in the processing division and in the tire compounding department in charge of new materials. In 1935 he went to the du Pont rubber laboratory and in 1939 became its division head in charge of tire development. Mr. Torrence represents the company at tire industry meetings and in contacts with the Army, WPB, and other agencies regarding tire programs and policies.

His fraternal associations include Sigma Alpha Epsilon and several local service clubs, and his hobbies are photography and promotion. Mr. Torrence has been a member of various committees of the Division of Rubber Chemistry, and he is the author of numerous publications dealing with the technology and manufacture of tires and tubes.

Maynard F. Torrence

## Adamson Machine Co. Becomes Adamson United Co.

As we were going to press, we learned that Adamson Machine Co., Akron, O., one of the pioneers in the development of much of the machinery and equipment used in the rubber industry, had been acquired by United Engineering & Foundry Co., Pittsburgh, Pa. A new company, Adamson United Co., with headquarters in Akron and with F. L. Dawes, general manager of the former Adamson Machine Co., as president and Andrew Hale, former Akron sales manager of Farrel-Birmingham Co., Inc., as vice president, will carry on and expand the activities of Adamson Machine Co. George Lang, secretary-treasurer of United Engineering, will have the same position with Adamson United. The purchase price is understood to have been about $1,500,000, which covers plant cost and provisions for some enlargement. United Engineering & Foundry is recognized as the world's largest designer and manufacturer of rolls and rolling mill equipment, and this transaction places the new Adamson United Co. in an advantageous position because of the facilities available through the parent company. More complete details will be presented in our February issue.

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# Patents and Trade Marks

## APPLICATION

### United States

2,361,943. **In a Supporting and Bonding Block for Conduits, a Cushion of Elastic Insulation Material.** L. P. Issoglio, Los Angeles, and H. R. Ellinwood, assignors to Adel Precision Products Corp., both of Burbank, both in Calif.

2,361,970. **Portable Milking Apparatus.** J. A. Schmidt, Milwaukee, assignor to Universal Milking Machine Co., Waukesha, both in Wis.

2,362,008. **Resilient Bearing including an Outer Cylindrical Shell, an Inner Cylindrical Member, and Interposed there between a Cylindrical Rubber Bushing.** H. H. Hille, Riverside, Conn., assignor to United Statts Rubber Co., New York, N. Y.

2,362,064. **Rubber Play Ball with Evenly Spaced Protuberances on the Body Surface.** M. Giesinger, New York, N. Y.

2,362,103. **In an Ampoule, an Elongated Cylindrical Glass Body Having a Rubber Plunger Stopper.** A. E. Smith, Los Angeles, Calif.

2,362,124. **In a Conduit Support, Elastic Compressible Members to Provide a Cushioned Seat for the Conduit.** H. R. Ellinwood, Burbank, Calif. assignor to Adel Precision Products Corp., a corporation of Calif.

2,362,141. **Blocks of Resilient Material Between the Driving and Other Abutments in a Vibration Absorbing Gear.** F. J. Loetterle, assignor to Aircooled Motors Corp., both of Syracuse, N. Y.

2,362,169. **A Sheet of Resilient Deformable Material in a Platform for a Shoe.** J. Q. Strong, Ladue, assignor of 55% to C W. Mathieson and 15% to P. H. Lamphere, both of Clayton, both in Mo.

2,362,250. **Combined Sink and Basin Stopper Having a Body of Material of a Hardness and Elasticity Similar to That of Rubber Combs.** M. Durst, Philadelphia, Pa.

2,362,340. **Draft Apron.** H. M. Bacon, assignor to Dayton Rubber Mfg. Co., both of Dayton, O.

2,362,356. **A Pair of Rolls with Spirally Disposed Rubber Wrappings in a Fruit Husker.** J. B. Crawford, Moline, Ill., assignor of one-half to L. O. Morford, Fort Dodge, Iowa.

2,362,363. **In a Unitary Sealing Ring for Shafts, a Deformable Rubber Ring Portion.** C. M. Doede, Hamden, assignor to Connecticut Hard Rubber Co., New Haven, both in Conn.

2,362,378. **Shoe Filler Consisting of Shredded Sponge Rubber Mixed with Resinous Binder and an Oil.** R. A. Holbrook, Beacon Falls, and W. O. Hooker, assignors to Sponge Rubber Products Co., both of Shelton, both in Conn.

2,362,537. **Equipment for Intravenous Injection.** W. F. Butler, assignor to Cutter Laboratories, both of Berkeley, Calif.

2,362,566. **Liquid-Lubricated Bearing with a Face of Resilient Rubber-Like Material.** R. Lappert, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,362,580. **Laminar Structure Having a Layer Consisting of a Mixture of Cellulose Nitrate and a Polyvinyl Compound, and a Layer of Polyvinyl Alcohol.** G. F. Nadeau, and C. B. Starck, assignors to Eastman Kodak Co., all of Rochester, N. Y.

2,362,638. **In Combination with a Continuous Track for a Track Laying Vehicle, a Removable Shoe with a Tread Vulcanized to One Side of It.** K. B. Kilbron, assignor to Wingfoot Corp., both of Akron, O.

2,362,643. **Under-Water Breathing Apparatus.** C. J. Lambertsen, Philadelphia, Pa.

2,362,675. **Detachable Plug for Mounting in a Wall Aperture and for Connecting to a Conduit.** C. S. Stebbins, Akron, O., assigner to B. F. Goodrich Co., New York, N. Y.

2,362,677. **Conveyer System.** E. W. Stephens, assignor to Wingfoot Corp., both of Akron, O.

2,362,775. **Life-Saving Device Including a Watertight Mask, Flexible Fitting and Tubes Attached Thereto.** D. Sebouth, New York, N. Y.

2,362,854. **In a Seal Assembly for a Machine Having a Rotating Shaft Extending Through a Wall of a Housing, Rubber-Like Seal Rings of Circular Cross-Sect.on.** W. T. Stephens, assignor to Hydraulic Control Engineering Co., both of Cleveland, O.

2,362,880. **Deformable Tubular Sealing Gasket for a Coupler.** T. A. Campbell, assignor to Stewart-Warner Corp., both of Chicago, Ill.

2,362,905. **Pour-Out Closure for Containers Including a Stretchable Gasket.** O. E. Kuhlman, Kansas City, Mo., assigner to W. A. Sheaffer Pen Co., Fort Madison, Iowa.

2,362,935. **Neck Seal for an Artificial Respirator Including a Pair of Superposed Flexible Diaphragms with an Opening, and Secured Between the Diaphragms, a Flexible Frame Which Holds an Elastic, Hollow, Ring-shaped Tube That Can Be Inflated to Fit Snugly About the Neck of a Patient.** L. Schlobohm and A. J. Farrar, assignors to Van Dorn Iron Works Co., all of Cleveland, O.

2,362,962. **Life-Saving Device Including an Inflatable Suit and an Inflatable Life Preserver Connected Thereto.** G. H. Bingham, Jr., Lincoln, assignor to Cambridge Rubber Co., Cambridge, both in Mass.

2,362,963. **In a Barrier Joint for Electric Power Cables a Built-Up Mass of Insulation Tape Swollen Within a Rigid Sleeve.** E. C. Lee, London, England, assignor to International Standard Electric Corp., New York, N. Y.

2,363,213. **Mold with a Mold Face of Resilient Material and a Backing of Rigid Material Held to Its Opposite Face by Means of Irregularly Shaped Projections of Resilient Material Embedded in the Rigid Material.** E. H. Wallace, Detroit, Mich., assignor to United States Rubber Co., New York, N. Y.

2,363,216. **Rubber Thumbpiece.** G. B. Wong, Newcastle, Calif.

2,363,219. **Machine Gun Belt Chute Having an Arched Channel, the Inner and Outer Walls of Which Are of Plastic Sheet Material.** H. Adamson, London, England, assignor to Celanese Corp. of America, a corporation of Del.

2,363,249. **Protector for Use by Parachutists Including Independent, Superimposed Inflatable Side Cells, and a Further Series of Inflatable Bottom Cells.** G. R. Hutchinson, Ruxton, assignor to R. V. Watson, Baltimore, both in Md.

2,363,324. **In a Molded V-Ring Insulation, a Reenforcing Fabric of Glass Fibers Carrying a Polyvinyl Derivative, Applied to the Outside of the V.** L. R. Hill, Wilkinsburg, assignor to Westinghouse Electric & Mfg. Co., East Pittsburgh, both in Pa.

2,363,431. **In Apparatus for Molding Plywood Including a Chamber Having an Upper Part and a Flat-Surfaced, Mold-Holding Lower Part, a Flexible Rubber Diaphragm in the Upper Part and a Rubber Gasket on the Edges of the Flat Surface of the Lower Part.** B. Moorhouse, Tuckahoe, N. Y., assignor to Epiphone, Inc., a corporation of N. Y.

2,363,455. **For a Welt Insole a Sewing Rib and Flange Preformed from a Plasticized Polyvinyl Resinous Compound.** W. C. Wright, Brookfield, N. H., assignor to Wright-Batchelder Corp., Boston, Mass.

2,363,456. **For Welt Insoles, a Sewing Rib and Horizontal Attaching Flange, Made of Koroseal, Vinylite, or the Like.** W. C. Wright, Brookfield, N. H., assignor to Wright-Batchelder Corp., Boston, Mass.

2,363,469. **Elastic Coupling for Rotary Members Loaded in Torsion.** M. Goldschmidt, assignor to Metalastik, Ltd., both of Leicester, England.

2,363,524. **Gasket of Resilent Material Having a Metal Reenforcement, the Whole Enclosed by Adhesively Secured Fabric.** A. W. L. Hartbauer, Chicago, Ill.

2,363,562. **Fuse Including a Casing, a Firing Element, and a Barrier Therefor Made of a Material with Elastic Properties Similar to Those of Soft Rubber.** W. E. Thibodeau, Cleveland, O., assignor to G. J. Kessenich, Madison, Wis.

2,363,592. **Plug for Conducting Fluid and Separably Engaging a Socket.** W. H. Hunter, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,363,644. **Expansible Packer for an Oil Well Casing Pump, Including an Annular Body of Elastic Material.** H. D. Collins, Tulsa, Okla., assignor to Lamtex Equipment Corp., Fort Worth, Tex.

2,363,660. **One-Piece Mask for a Tubular Element Including an Elongated Body of Resilent Material Contractible When Moved Lengthwise Within the Tubular Element.** J. E. Duggan, Detroit, Mich.

2,363,688. **Packing Consisting of a Tubular Fabric Casing Enclosing a Mass of Discrete Non-Elastic Particles and a Separate Mass of Discrete Particles of an Elastic Material.** A. E. Rains, Spokane, Wash.

2,363,779. **A Press Actuated by Sections of Inflatable Hose.** D. H. Duffy, J. W. Wiley, and M. M. Ross, assignors to Beech Aircraft Corp., all of Wichita, Kan.

2,363,842-2,363,846. **Mask Structure,** J. E. Duggan, New Brighton, Pa.

### Dominion of Canada

423,510. **The Use of a Backing Sheet Coated with Rubber Latex Adhesive Making Pile Fabric.** Behr-Manning Corp., Troy, N. Y., assignee of W. H. King, Perth Amboy, N. J., both in the U. S. A.

423,581. **To Form a Non-Slipping Connection between the Endless Driving Member and the Slides of V-Pulleys in a Variable Speed Gear, a Rubber Member on Each Slide.** A. Booth Salford, 6, Lancashire, and F. H. Coles, Epsom, Surrey, both in England, assignee of one-half.

423,613. **Life-Saving Suit with Rubber Means for Attaching Self-Buoyant Members to the Garment's Interior.** H. G. Morner, New York, N. Y., U. S. A.

423,647. **Improved Double-V-Belt with a Hexagonal-Shaped Inner Strength Section.** Dayton Rubber Mfg. Co., Dayton, O., assignee of V. G. Reiling, Boston, Mass., both in the U. S. A.

423,666. **Grooved Ring Packing of Resin-Impregnated and Bonded Fabric Layers to Which is Molded a Flexible Rubber Lip Having Integral Ribs Extending into and Filling the Grooves in the Inner Face of the Ring.** Johns-Manville Corp., New York, N. Y., U. S. A., assignee of G. W. Neesen, Somerville, N. J., both in the U. S. A.

423,679. **Coupling for Tubes Including an Elastic Packing.** Parker Appliance Co., assignee of A. L. Parker, both of Cleveland, O., U. S. A.

423,694. **In a Joint Construction, a Bushing Unit Consisting of a Rubber Body Member and Inner and Outer Metal Shells Vulcanized thereto.** Thompson Products, Inc., Cleveland, O., assignee of A. Venditty, Detroit, Mich., both in the U. S. A.

423,698. **Panel Structure Consisting of Two Connected Panels Enclosing a Body Part of Thick Cloth Connected with the Inner Face of One of the Panels by Means of a Permanently Tacky Rubber Base Coating over an Intermediate Vulcanized Rubber Coating.** Van Cleef Bros., (a partnership consisting of Felix, Noah, and Paul Van Cleef.), assignee of F. Van Cleef, both of Chicago, Ill., U. S. A.

423,750. **Non-Skid. All-Weather Tire.** J. P. Tarbox, Philadelphia, Pa., U. S. A.

423,804. **Spinning Roll Cover of a Vulcanized Acrylic Nitrile and Butadiene Copolymer Composition.** Dayton Rubber Mfg. Co., assignee of H. M. Bacon, both of Dayton, O., U. S. A.

423,811. **Belting.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of W. Lord and S. A. Brazier, both of Manchester, England.

423,812. **Tire Valve with a Rubber Body.** Dunlop Tire & Rubber Goods Co., Ltd., Toronto, Ont., assignee of S. C. Parker, Birmingham, Warwick, England.

423,847. **In a Machine for Applying Pressure to Shoe Bottoms, an Inflatable Pad.** United Shoe Machinery Co. of Canada, Ltd., Montreal, P. Q., assignee of S. J. Finn, Beverly, Mass., U. S. A.

423,905. **Shoe Stiffener Consisting of a Sheet of Felt Impregnated with a Thermoplastic Compound of Rubber, Wax, and Coumarone-Indene Resin.** Beckwith Mfg. Co., Dover, N. H., assignee of A. P. Swett, Westwood, Mass., both in the U. S. A.

423,963. **Piston Packing Including a Yieldable, Substantially Uniformly Hardened Plastic Material.** Johns-Manville Corp., New York, N. Y., assignee of G. Christenson, North Plainfield, N. J., both in the U. S. A.

423,968. **Vibrator with Molded Rubber Lining.** P. R. Mallory & Co., Inc., assignee of C. Huetten, both of Indianapolis, Ind., U. S. A.

423,994. **Cellulose Mesh Material Coated with Rubber.** Research Products Corp., Madison, Wis., assignee of C. F. Burgess Laboratories, Inc., Chicago, Ill., assignee of N. E. Weiss, Madison, Wis., executrix of the estate of H. F. Weiss, now deceased, in his lifetime of Madison, Wis., both in the U. S. A.

424,031. **Elastic Knitted Fabric.** H. Dreyfus, assignee of H. B. Hayto, both of London, and W. B. Mattinson, Spondon, both in England.

### United Kingdom

563,055. **Clamping Device to Connect the Ends of Broken Cables or the Like.** S. T. Hosken.

563,056. **Flexible Hose Carrier.** C. M. Best.

564,400. **Flexible Couplings.** T. L. Fawick.

564,463. **Internally Insulated Metal Tubing.** Power Flexible Tubing Co., Ltd.

564,472. **Resilient Bodies of Diaphragm Type.** Power Flexible Tubing Co., Ltd.

564,527. **Fluid-Tight Couplings.** Dunlop Rubber Co., Ltd., and W. Cooper.

564,580. **Tire.** Firestone Tire & Rubber Co.

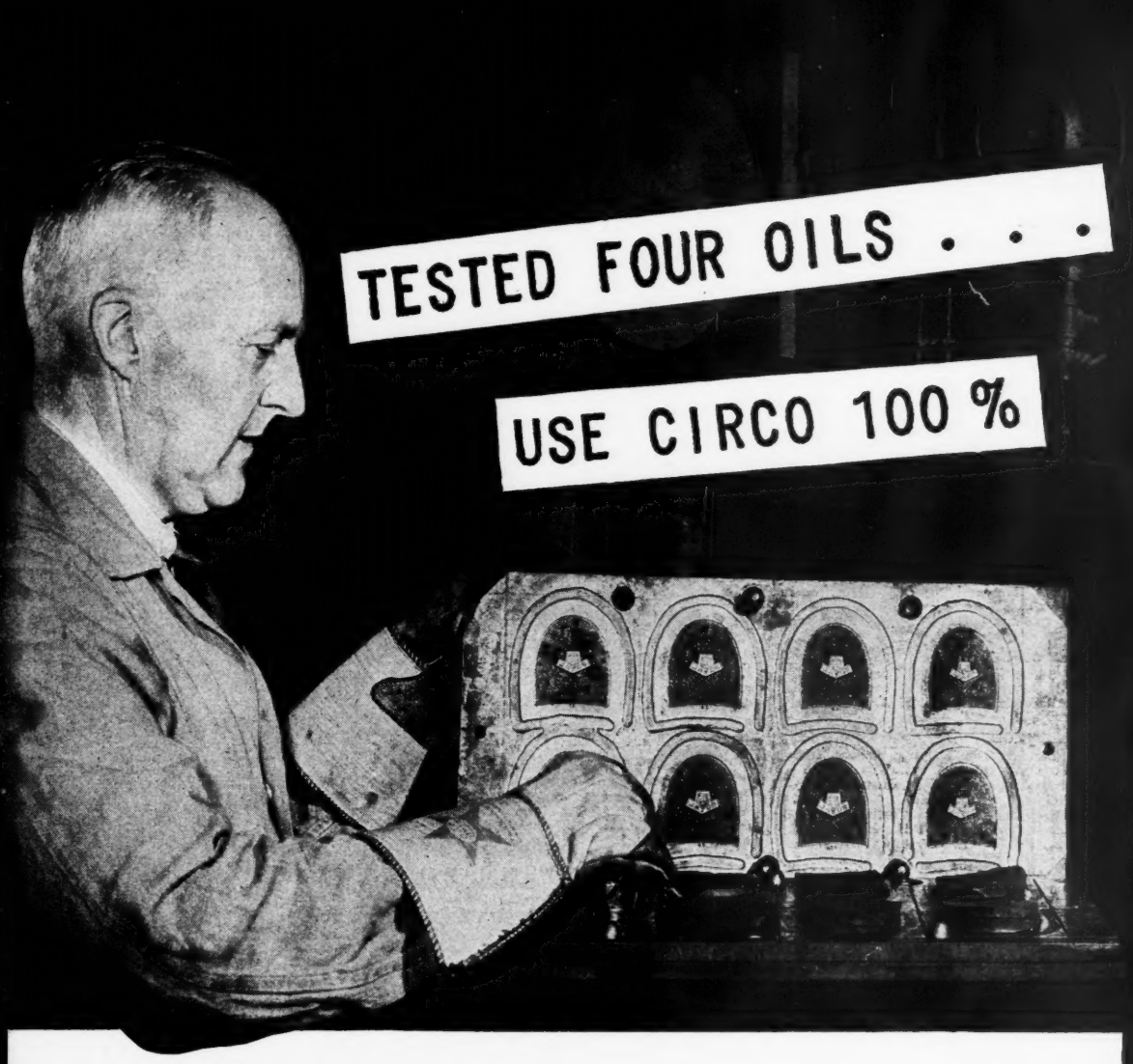
564,705. **Pneumatic Tire and Wheel Assemblies.** Wingfoot Corp.

564,749. **Vaginal Syringes.** Hygienic Stores, Ltd., and G. H. Young.

564,798. **Portable Conveyer System.** Wingfoot Corp.

564,802 **Adjustable Seats.** Firestone Tire & Rubber Co.

565,162. **Pneumatic Tire.** United States Rubber Co.

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# PROCESS

## United States

2,361,938. **Vulcanizable Outsole.** J. Gregg, Flemington, N. J.

2,362,574. **Coating Footwear of Rubber-Like Material.** C. H. Magurn, Arlington, Mass., assignor to B. F. Goodrich Co., New York, N. Y.

2,362,653. **Treating an Unvulcanized Tire to Facilitate Air-Bag Insertion and Removal and to Facilitate Removal of the Tire from the Vulcanizing Mold.** B. F. McGovern, assignor to Wingfoot Corp., both of Akron, O.

2,363,086. **Golf Ball Cores.** G. K. Ryan, Akron, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,363,508. **Producing a Rubber Inflation Valve Element Including a Stem.** H. G. Doster, Wadsworth, and R. H. Hanlon, Sharon Center, assignors to Ohio Injector Co., Wadsworth, both in O.

2,363,871. **Insulated Electrical Conductor.** A. W. Keen, Packanack Lake, and R. B. Frost, Rutherford, both in N. J., assignors to United States Rubber Co., New York, N. Y.

2,363,981. **Improving the Adhesion of Rubber to Fibrous Materials.** E. T. Lessig, Silver Lake, and E. N. Cunningham, Cuyahoga Falls, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

## Dominion of Canada

423,652. **Corrugated Tubes.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of W. G. Harding, Radburn, N. J., U. S. A.

## United Kingdom

564,126. **Molding and Shaping Articles from Thermoplastic Sheet Material.** C. G. Gregory.

564,245. **Insulated Electrical Conductors.** Duratube & Wire, Ltd., and J. Veit.

564,324. **Extrusion of Thermoplastic Materials.** British Insulated Cables, Ltd., H. M. Steward, R. Blackburn, H. R. F. Carsten, and J. L. Packer.

564,422. **Waterproof Fabrics.** Ioco Rubber & Waterproofing Co., Ltd., A. Ryan, and G. Cameron.

564,471. **Insulated Electrical Conductors.** United States Rubber Co.

564,673. **Impregnating Hose Pipes Woven from Natural or Synthetic Fibers.** F. S. Zabala.

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# CHEMICAL

## United States

2,361,941. **In Making Ribbed Insoles, Providing a Tough and Resilient Stitch-Retaining Re-enforcement Directly Combined with the Insole by Applying a Liquid Resinous Monomer Converted by Polymerization *in Situ* into a Solid Continuous Sheet.** R. B. Harrsion, assignor to Beckwith Mfg. Co., both of Dover, N. H.

2,361,994. **In the Manufacture of Vinyl and Ethylidene Esters, the Improvement of Reacting the Acetylene and Carboxylic Acid in the Presence of a Small Amount of Cacodyl Oxide.** F. O. Cockerille, Albermarle County, Va., assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, Del.

2,362,018. **Heat-Hardenable Oil-Containing Phenolic Resins.** A. P. Mazzucchelli, Bloomfield, N. J., assignor to Bakelite Corp., New York, N. Y.

2,362,026. **Improving the Water-Resistant Characteristics of Plasticized Polyvinyl Alcohol by Incorporating a Substantially Water-Insoluble Secondary Aromatic Amine, and a Chloride of an Amphoteric Metal.** J. D. Quist, Detroit, Mich., assignor to United States Rubber Co., New York, N. Y.

2,362,049. **Preparing Acrylonitriles Containing an Aromatic Substituent in the Alpha Position.** A. M. Clifford, Stow, and J. R. Long, assignors to Wingfoot Corp., both of Akron, both in O.

2,362,052. **In the Distillation of Volatile Water-Insoluble Materials from Aqueous Polymer Dispersions, the Use of a Water-Soluble Polyvalent Metal Salt and an Alkali Metal to Reduce Formation of Foam during Distillation.** D. Craig, Silver Lake, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,362,218. **Preparing Butadiene from n-Butane.** W. A. Schulze and J. C. Hillyer, both of Bartlesville, Okla., assignors to Phillips Petroleum Co., a corporation of Del.

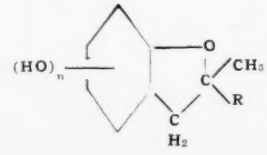
2,362,227. **Recovering Cyclopentadiene Contained in Benzol Forerunnings Substantially Free from Benzene.** J. H. Wells and P. J. Wilson, Jr., both of Pittsburgh, Pa., assignors to Carnegie-Illinois Steel Corp., a corporation of N. J.

2,362,274. **Aqueous Phenolic Resin Solutions.** D. A. Hurst, Haddonfield, N. J. assignor by mesne assignments to Allied Chemical & Dye Corp. a corporation of N. Y.

2,362,397. **Applying to Metal a Uniform, Resinous, Non-Waxlike Protective Coating at Least Four Mils Thick, Which Is Prepared from Polymeric Vinyl Halides, Polymeric Vinyl Esters and Polymeric Esters Which in the Monomeric Form Had the Formula $CH_2{=}CRCOOR'$, Where R Is of the Class of Hydrogen and Alkyl Groups and R' Is an Alkyl Group.** W. T. Pearce, Lower Merion Township, assignor to Resinous Products & Chemical Co., Philadelphia, both in Pa.

2,362,463. **Activated Carbon.** R. M. Boehm and H. E. Hall, assignors to Masonite Corp., all of Laurel, Miss.

2,362,479. **Rubber Antioxidant of the Structure**



**in Which R Is of the Class of Hydrogen and Alkyl Groups, and N Is an Integer Less than Three.** C. F. Gibbs, Cuyahoga Falls, O., assignor to B. F. Goodrich Co., New York, N. Y.

2,362,511. **Lactic Acid-Modified Polyglycolide Resin.** W. O Teeters, Roselle, assignor to E. I. du Pont de Nemours & Co., Inc., Wilmington, both in Del.

2,362,516. **As Antioxidant, an Organic Composition Which Contains a Small Amount of a Branched Chain Aliphatic Ester of a Petroleum Phenol.** J. I. Wasson, Union, N. J., and W. M. Smith, Baton Rouge, La., assignors to Standard Oil Development Co., a corporation of Del.

2,362,538. **Composition of Rubber and an Acid-Gelled Solution of Shellac in a Glycol Whose Molecular Weight Is no Greater than 400.** S. Caplan, New York, N. Y., assignor to Harvel Research Corp., a corporation of N. J.

2,362,648. **In Preparing an Organic Isocyanate by Reacting the Corresponding Amine with Phosgone, the Improvement of Carrying Out the Reaction in the Presence of a Tertiary Amine as Catalyst.** J. G. Lichty, Stow, and N. V. Seeger, Cuyahoga Falls, assignors to Wingfoot Corp., Akron, all in O.

2,362,888. **Producing a Resinous Material by Heating a Reaction Mixture Consisting of a Rosin Ester, an Alkaline Earth Metal, and an Inert Solvent.** R. F. B. Cox, assignor to Hercules Powder Co., both of Wilmington, Del.

2,362,894. **Wetting-Out Composition consisting of a Member of the Group of Caprylic Acid Mono-Esters of triethanolamine and Salts Thereof together with a Fatty Acid Partial Ester of a Member of the Group of Glycerol and Glycols.** A. K. Epstein and M. Katzman, assignors to Emulsol Corp., all of Chicago, Ill.

2,362,934. **Mastic Tile Composition Consisting of a Binder of the Group of Asphalts and Coumarome-Indene Resins, Asbestos Fiber, and a Plasticizer for the Binder.** R. F. Schlaanstine, Kennett Square, Pa., assignor to Hercules Powder Co., Wilmington, Del.

2,362,960. **Copolymerization Product of Vinyl Chloride and Vinyl Fluoride.** C. A. Thomas, Dayton, O., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,362,961. **Composition Consisting of a Polyvinyl Acetal Resin and Rubber.** W. E. Welch, Springfield, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,363,034. **Composition of Matter Consisting of a Triethanolamine-Reacted Sub-Rubbery Polymeric Sulphur-Converted Tri-Ricinolein.** G. Allen, Long Beach, Calif., assignor to Petrolite Corp., Ltd., St. Louis, Mo.

2,363,035. **Composition of Matter Consisting of a Tri-Ethanolamine-Reacted Phthalic-Acid-Reacted Sub-Rubbery Polymeric Sulphur-Converted Tri-Ricinolein.** G. Allen, Long Beach, Calif., assignor to Petrolite Corp., Ltd., St. Louis, Mo.

2,363,044. **Polymerized Terpinyl Methacrylate.** A. M. Clifford, Stow, assignor to Wingfoot Corp., Akron, both in O.

2,363,051. **Cellular Rubber.** L. P. Dosmann, Mishawaka, Ind., assignor to United States Rubber Co., New York, N. Y.

2,363,103. **Heating a Mixture of Polylactylic Acids and a Fatty Drying Oil at a Temperature and for a Time Sufficient to Cause the Mixture to Become Resinified to a Soft, Elastic Material; Then Baking the Material on a Metal Surface.** P. D. Watson, Alexandria, Va., assignor to the United States of America, as represented by C. R. Wickard, Secretary of Agriculture, and his successors in office.

2,363,157 and 2,363,158. **Purifying Piperidine.** H. L. Stasse, Hawthorne, N. J., assignor to Allied Chemical & Dye Corp., New York, N. Y.

2,363,252. **Separation of Crystalline Hydro Rosin Acids from a Hydrogenated Rosin.** W. J. Kirkpatrick, Marshallton, assignor to Hercules Powder Co., Wilmington, both in Del.

2,363,286. **Preparing Vinyl Acrylate by Reacting on Acrylic Acid with Acetylene in the presence of a Mercuric Salt and Hydroquinone at Temperatures of from 50 to 95°.** C. W. Bauer and C. F. Kautter, Darmstadt, both in Germany, assignors to Rohm & Haas Co., Philadelphia, Pa.

2,363,289. **Moistureproofing Cellulosic Sheet by Applying a Coating Made by Mixing Wax and a Hydrocarbon Polymer Produced by Hydrogenating Raw Rubber and Polymerizing Isobutylene, and Then Combining the Resultant Product with Cyclized Rubber.** F. D. Bergstein, Cincinnati, O.

2,363,297. **Composition Including the Reaction Product of (1) the Hydrolized Infusible, Insoluble Copolymer of a Vinyl Ester of an Organic Carboxylic Acid Having a Single $CH_2{=}C<$ Grouping and a Divinyl Aryl Compound, and (2) a $C{=}O$ Containing Organic Compound of the Class of Aldeydes and Ketones.** G. F. D'Alelio, Pittsfield, Mass., assignor to General Electric Co., a corporation of N. Y.

2,363,598. **The 2, 4-Dinitrophenyl Ester of 2-Mercaptothiazoline.** P. C. Jones and R. A. Mathes, Akron, O., assignors to B. F. Goodrich Co., New York, N. Y.

2,363,607. **Reaction Product of an Aldehyde with an Iminoalkyl Sulphide.** R. A. Mathes, Akron, and P. C. Jones, Silver Lake, both in O., assignors to B. F. Goodrich Co., New York, N. Y.

2,363,614. **Polysulphide Copolymers,** J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Trenton, N. J.

2,363,615. **Reacting a Polymer of the Unit** $-CH(R)-CH_2-S_2-$ **to** $-CH(R)-CH_2-S_4-$ **Where R Is from the Group of a Hydrogen Atom, an Alkyl Radical, an Aralkyl Radical and an Aryl Radical, with a Polymer of the Unit** $-C\ .\ .\ .\ C-S_2-$ **to** $-C\ .\ .\ .\ C-S_4-$ **Where —C . . . C— Represents Two Carbon Atoms Joined to and Separated by Intervening Structure.** J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Trenton, N. J.

2,363,616. **Reacting an Alkaline Metallic Polysulphide with a Substance of the Formula** $HC(R){=}O$ **Where R Is from the Group Consisting of a Hydrogen Atom, an Alkyl Radical, an Arakyl Radical, and an Aryl Radical, to Form a First Polymer; Reacting an Alkaline Polysulphide with a Compound of the Formula X—C . . . C—X' Where —C . . .C— Represents Carbon Atoms Joined to and Separated by Intervening Structure, and X and X' Are Substituents Split off during the Reaction to Form a Second Polymer, and Reacting, First and Second Polymers to Form a Copolymer.** J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Trenton, N. J.

2,363,617. **Composition Consisting of a Copolymer of Butadiene with a Substance from the Group of Acrylic Nitrile and Styrene, and a Plasticizer from the Group of Polyglycol Halides and Polyglycol Esters of Lower Fatty Acids.** J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Trenton, N. J.

2,363,618. **Composition Including a Lower Fatty Acid Ester of a Polythioglycol Incorporated with a Copolymer of Butadiene and a Substance of the group of Acrylic Nitrile and Styrene.** J. C. Patrick, Morrisville, Pa., assignor to Thiokol Corp., Trenton, N. J.

2,363,654. **Hard, Boardy Thermoplastic, the Conversion Product of a Mix Consisting of a Rubber, a Curing Agent, and a Hard, Highly Puriged Resinous Rubber Isomer Obtained by Heating Rubber in Excess of a Phenol in the Presence of an Acidifying Isomerizing Agent at a Temperature above 125° C., but below the Boiling Point of the Phenol.** L. E. Daly, Osceola, Ind., assignor to United States Rubber Co., New York, N. Y.

2,363,676. **Purifying Methyl Styrene Contained in a Mixture Including Methyl Phenyl Acetylene.** C. W. Jordan, Paoli, Pa., assignor to United Gas Improvement Co., a corporation of Pa.

2,363,687. **As an Antioxidant, a 5,8-Dihydro Dihydroxy Naphthalene in Which the Dihydroxy Groups are Chosen for Placement from the Class Consisting of the 1,2 and the 1,4 Positions in the Naphthalene Nucleus.** P. T. Paul, Naugatuck, Conn., assignor to United States Rubber Co., New York, N. Y.

2,363,703. **Rubbery Composition Prepared from a Low-Temperature Interpolymer of a Major Proportion of Isobutylene with a Minor Proportion of a Conjugated Diolefin, Carbon Black, Sulphur, a Sulphurization Aid, Zinc Oxide,** and

*with*

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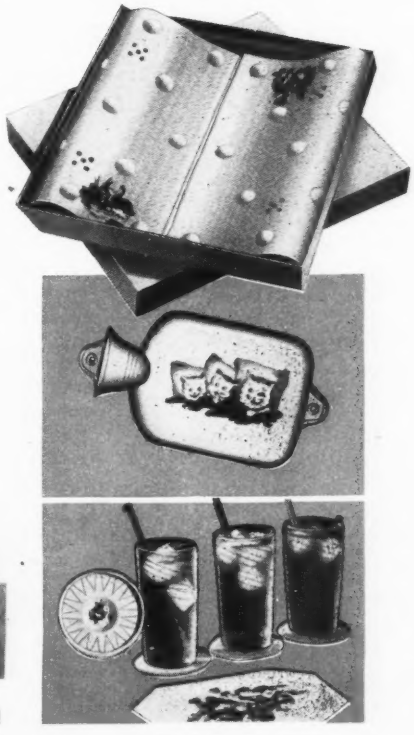

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**Stearic Acid.** W. J. Sparks, Peoria, Ill., and R. M. Thomas, Union, N. J., assignors by mesne assignments to Jasco, Inc., a corporation of La.

2,363,832. **Plasticizing Synthetic Inorganic Gelatinous Materials to Form a Plastic Product Suitable for Molding.** G. C. Connolly, Baton Rouge, La., assignor to Standard Oil Development Co., a corporation of Del.

2,363,836. **Heat-Convertible, Fusible Polymer of Divinyl Benzene.** G. F. D'Alelio, Pittsfield, Mass., assignor to General Electric Co., a corporation of New York.

2,363,873. **Reclaiming Waste Polychloroprene by Heating at a Temperature from 300° to about 420° F. in the Presence of a Di(Hydroxyaryl) Sulphide.** W. G. Kirby and L. E. Steinle, both of Naugatuck, Conn., assignors to United States Rubber Co., New York, N. Y.

2,363,893. **Condensation Product of a Phenol and an Aldehyde, Which Is Modified by a Member of the Class of Formaldehyde-Soluble Acetates of Gelatin, Abieto Acetates of Gelatin, and Boroabieto Acetates of Gelatin.** J. B. Monier, Montreal, P. Q., Canada.

2,363,925. **Separation of Tall Oil into Components.** F. W. Adams, Pittsburgh, Pa., assignor to Pittsburgh Plate Glass Co., Allegheny County, Pa.

2,363,951. **Process for Continuously Polymerizing in Aqueous Emulsion Organic Monomeric Polymerizable Compounds Lighter Than Water, Yielding a Dispersion of Polymerizates Heavier Than Water.** H. Fikentscher, Ludwigshafen-on-the Rhine, Germany, assignor by mesne assignments to General Aniline & Film Corp., New York, N. Y.

2,364,027. **Resinous Composition Consisting of a Vinyl Aromatic Resin Which Normally Becomes Discolored on Aging, and as Stabilizing Agent Therefor an Aromatic Hydrocarbon Compound.** A. L. Marshall, Springfield, Mass., assignor to Monsanto Chemical Co., St. Louis, Mo.

2,364,034. **Rubber-like Thermoplastic Products of High Molecular Weight Produced by Reacting a Protein, Monochloracetic Acid, and Ammonium-Sulphocyanide and Phenol at 100° C., Then Adding an Aldehyde and Heating the Mixture at 100° C.** O. Huppert, Newark, N. J.

## Dominion of Canada

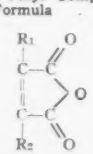
423,301. **Resin from a Hard, Stable, Oil-Soluble Ester of Pentaerythritol, a Rosin Acid, and an Alpha-Beta Unsaturated Polybasic Acid.** Hercules Powder Co., Wilmington, assignee of F. G. Oswald, Newark, both in Del., U. S. A.

423,381. **Insoluble and Infusible Solid from Diallyl Fumarate Mixed with Vinyl Acetate, Heated until Polymerization Is Complete.** American Cyanamid Co., New York, N. Y., assignee of T. F. Bradley, Stamford Conn., both in the U. S. A.

423,401. **Removing Cations from Liquid Media by Contacting with a Mass Consisting of an Insoluble, Infusible Copolymer of a Polymerizable Mixture Including (1) at Least One Compound Having a Polymerizable $CH_2 = C<$ Grouping and at Least One Other Polymerized Grouping, the Unsaturated Bonds of These Groupings Being Non- Conjugated, (2) Styrene, and (3) Maleic Anhydride.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass., U. S. A.

423,402. **Removing Cations from Liquid Media by Contacting with a Mass Consisting of an Insoluble, Infusible Copolymer of a Polymerizable Mixture Including (1) at Least One Compound Having a Polymerizable $CH_2 = C<$ Grouping and at Least One Other Polymerizable Grouping, the Unsaturated Bonds of the Polymerizable Groupings Being Non-Conjugated, and (2) at Least One Acrylic Acid.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass., U. S. A.

423,452. **Synthetic Resinous Product from a Mixture of a Vinyl Compound and an Anhydride of the Formula**



**Where $R_1$ and $R_2$ Each Stand for One of a Group consisting of Hydrogen, Halogen, Sulphonic Acid Radical, Alkyl Radical, Aryl Radical, and Aralkyl Radical.** United Gas Improvement Co., Philadelphia, Pa., assignee of H. L. Gerhart, Milwaukee, Wis., both in the U. S. A.

423,515. **Composition Consisting of the Polymerization Product of a Vinyl Halide and a Polycarboxylic Ester of a Nuclearly Halogenated Benzyl Alcohol.** Canadian General Electric Co., Ltd., Toronto, Ont., assignee of G. F. D'Alelio, Pittsfield, Mass., U. S. A.

423,559. **Dehydrating and Heat-Bodying a Mixture of Castor Oil and an Unsaturated Alcohol Ester of a Polybasic Acid in the Presence of a Dehydration Catalyst to Obtain a Resinous Product.** Shell Development Co., San Francisco, assignee of F. A. Bent, Berkeley, and C. R. Ryan, Albany, all in Calif., U. S. A.

423,650. **Improving the Flex-Cracking Properties of Rubber Compositions by Incorporating therein a Phenol; the Position Para to the Phenolic Hydroxyl Group Is Occupied by a Tertiary Alkyl Group.** Dominion Rubber Co., Ltd., assignee of R. T. Armstrong, New York, N. Y., U. S. A.

423,651. **As an Antioxidant for Rubber, a Reaction Product of a Polyhydric Phenol and an Aliphatic Diene.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of P. T. Paul, Naugatuck, Conn., U. S. A.

423,653. **As an Antioxidant, a Sulphonyl Amino Phenol.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of C. W. Gates, Elmira, Ont.

423,654. **Polymeric Vinylidene Chloride Composition Stabilized with a Compound from the Group of 2.2'-Dibydroxy-Benzophenone and 2.4'-Dihydroxy-Benzophenone.** Dow Chemical Co., assignee of R. F. Boyer, L. A. Matheson, and C. L. Moyle, all of Midland, Mich., U. S. A.

423,696. **Improving the Flex-Cracking Properties of Rubber by Incorporating a 3-Methyl-4-Alkyl Phenol.** United States Rubber Co., New York, N. Y., assignee of E. J. Hart, Cedar Grove, N. J., U. S. A.

423,710. **Adhesive Film Consisting of a Layer of a Water-Soluble Urea-Formaldehyde, and a Layer of Ammonium Chloride as a Hardener for the First Layer.** I. G. Farbenindustrie, A.G., Frankfurt a. M., assignee of A. Menger, Krefeld-Uerdingen, both in Germany.

423,711. **Adhesion Process by Which Wood Is Cemented Together with an Adhesive in the Form of a Liquid Foam Including a Urea Formaldehyde Condensation Product and an Acid Hardener.** I. G. Farbenindustrie, A.G., Frankfurt a. M., assignee of A. Menger and E. Bock, both of Krefeld-Uerdingen, both in Germany.

423,822. **Resin Including an Esterification Product of a Polypentaerythritol with a Rosin Acid and an Alpha Beta Unsaturated Polybasic Acid.** Hercules Powder Co., Wilmington, assignee of G. R. Anderson, Elsmere, both in Del., U. S. A.

423,919. **Moistureproof Coating Composition for Regenerated Cellulose Sheet Consisting of Nitrocellulose, Paraffin Wax, Ethyl Acetate, Toluene, Alkyd Resin, Dibutyl Phthalate.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. S. Haven and W. Berry, both of Bridgwater, Somerset, England.

423,920. **Splitting Ethylidene Diacetate to Form Acetaldehyde and Acetic Anhydride.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. O'N. Cockerille, Waynesboro, Va., U. S. A.

423,921. **Splitting Ethylidene Diacetate to Form Acetaldehyde and Acetic Anhydride.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. Schulze, Waynesboro, Va., U. S. A.

423,922. **Coating Composition Highly Resistant to Chalking or Bronzing, Including a Pigment Normally Subject to Chalking or Bronzing in the Film, Cellulose Nitrate, a Plasticizer, and a Modified Polyhydric Alcohol-Polybasic Acid Resin.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. R. Ensminger, New Brunswick, N. J., U. S. A.

423,923. **Polymer of Ethylene in Spongy Form.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. L. Johnston, Claymont, Del., U. S. A.

423,924. **Coating Composition Highly Resistant to Oils and Greases, Consisting of Cellulose Nitrate and a Modified Alkyd Resin, Besides an Aliphatic Dicarboxylic Acid.** Canadian Industries, Ltd., Montreal, P. Q., assignee of W. K. Moffett, South River, N. J., U. S. A.

423,925. **Solution of a Synthetic Linear Polyamide in a Solvent Mixture of Alcohol and Halogenated Hydrocarbon.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. T. Peters, Wilmington, Del., U. S. A.

423,926. **Solution of Synthetic Linear Polyamide in an Unsaturated Alcohol.** Canadian Industries, Ltd., Montreal, P. Q., assignee of F. T. Peters, Wilmington, Del., U. S. A.

423,927. **Water-Alcohol Solution of a Synthetic Linear Interpolyamide.** Canadian Industries, Ltd., Montreal, P. Q., assignee of R. M. Leekley, Wilmington, Del., U. S. A.

423,928. **Devulcanizing Whole Tire Scrap with a Thiophenyl at Temperatures from 150° C. to 200° C.; Then Subjecting the Mass to the Action of a Dilute Aqueous Solution of Sodium Hydroxide at 160° C. to 200° C. to Destroy the Fabric in the Rubber.** Canadian Industries, Ltd., Montreal, P. Q., assignee of A. M. Neal and F. R. Schaffer, both of Wilmington, Del., U. S. A.

423,932. **Wire Enamel Consisting of a Polyamide, an Alkyd Resin, and a Phenol-Aldehyde Resin.** Canadian Industries, Ltd., Montreal, P. Q., assignee of S. J. Roskosky, Flint, Mich., U. S. A.

423,933. **To Join Polythene to a Base, a Mixture of Polymerized Ethylene and a Cyclo-Rubber.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. L. Chield, R. B. Fisher, F. Clarke, and B. J. Habgood, all of Blackley, Manchester, England.

423,938. **Sheet Material Coated with a Condensation Product Consisting of Cyclized Rubber Reacted with a Carbonyl Compound from the Group of Acrylic Acid, Crotonic, Methacrylic Acid, Cinnamic Acid, Maleic Acid, Itaconic Acid, Maleic Acid Anhydride, Citraconic Acid Anhydride, and Citric Acid.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. A. Mitchell, Kenmore, N. Y., U. S. A.

423,939. **Coating Composition Made from Phenol Rubber Product, Polymer of Isobutylene and Wax.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. A. Mitchell, Kenmore, N. Y., U. S. A.

423,940. **Sheet Wrapping Material Coated with a Composition of Cyclized Rubber, Paraffin Wax, and Polybutene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. A. Mitchell, Kenmore, N. Y., U. S. A.

423,941. **Sheet Material Coated with a Condensation Product Consisting of Beta-Naphthol Rubber Product Reacted with a Carbonyl Compound from the Group of Acrylic Acid, Crotonic Acid, Methacrylic Acid, Cinnamic Acid Anhydride, and Citric Acid.** Canadian Industries, Ltd., Montreal, P. Q., assignee of J. A. Mitchell, Kenmore, N. Y., U. S. A.

423,942. **Flexible, Transparent Sheet Material Consisting of a Reticulated Base of Monofils of Synthetic Linear Polyamide Embedded in a Film of Solid Polymer of Ethylene.** Canadian Industries, Ltd., Montreal, P. Q., assignee of G. L. Dorough, Niagara Falls, N. Y., and G. H. Latham, Wilmington, Del., both in the U. S. A.

423,949. **Carbon Black for Rubber Compounding.** Columbian Carbon Co., New York, N. Y., assignee of W. B. Wiegand, Old Greenwich, Conn., and H. A. Braendle, Flushing, N. Y., both in the U. S. A.

423,954. **As an Atmospheric Cracking Inhibitor for Rubber, an N-(Amino-Aryl) 2,5-Dimethyl Pyrrole.** Dominion Rubber Co., Ltd., Montreal, P. Q., assignee of B. C. Barton, Passaic, N. J., U. S. A.

424,006. **Production of a Solid Thermoplastic Resin from a Chlorinated Oily Polymer of Propylene.** Standard Oil Development Co., Linden, assignee of L. A. Bannon, Cranford, P. K. Frolich, Westfield, and C. E. Morrell, Roselle, all in N. J., U. S. A.

## United Kingdom

563,747. **Hydroxyaryl Aldehydes.** Wingfoot Corp.

563,753. **Reclaiming Waste Polychloroprenes.** United States Rubber Co.

563,766. **Preparing Sulphanilyl Guanidine.** American Cyanamid Co.

563,885. **Hydration of Olefins.** W. H. Groombridge and R. Page.

563,904. **Oil-Modified Alkyd Resin Enamel Compositions.** Imperial Chemical Industries, Ltd.

563,942. **Hydroxy Arylidene Amines.** Wingfoot Corp.

563,991. **Polyvinyl Compounds.** R. P. Roberts, E. B. Johnson, and H. H. Taylor.

563,992. **Molded Articles from Iso Olefin-Diolefin Copolymers.** Standard Oil Development Co.

564,127. **Plastic Compositions.** Pirelli-General Cable Works, Ltd., and H. and G. L. Barron.

564,196. **Plasticizing Polyvinyl Chloride.** American Cyanamid Co.

564,259. **Resilient Product as Substitute for Sponge Rubber.** H. G. W. Chichester-Miles and W. O. Street.

564,261. **Methyl Beta Chloracrylate.** Wingfoot Corp.

564,284. **Copolymers of Vinyl Cyanide.** Wingfoot Corp.

564,412. **Thiazyl Derivatives.** Wingfoot Corp.

564,424. **Resinous Products Formed from 3-Methylol 5, 5-Dimethyl Hydantoin.** E. I. du Pont de Nemours & Co., Inc., and J. F. Walker.

564,473. **Chlorobutadiene.** E. I. du Pont de Nemours & Co., Inc.

564,506. **Condensation Products of Aldehydes and Polyhydroxy Alkylamines.** American Cyanamid Co.

564,514. **Regenerating Synthetic Rubber-Like Materials and Utilization of Regenerated Material thus Obtained.** Dunlop Rubber Co., Ltd., D. F. Twiss, P. H. Amphlett and A. J. Hughes.

564,570. **Heat Insulating Products with Hydrogenated Rosin or Its Derivatives as Binder.** Hercules Powder Co.

564,576. **Resinous Condensation Products.** British Thomson-Houston Co., Ltd.

564,615. **Rubber-Like Substance.** W. G. Martin (L. A. Weisman).

564,762. **Stable Formaldehyde Compositions Containing a Hardener.** Plaskon Co., Inc.

564,828. **Vinyl Compounds.** Mathieson Alkali Works.

564,829. **Thermoplastic Resins.** Mathieson Alkali Works.

564,999. **Resinous Condensation Products.** British Thomson-Houston Co., Ltd.

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Old-fashioned wax bottle for HF that has proved inadequate over the years.

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★ No more risk of acid contamination in open bottle on the shelf.

★ No more problem and annoyance of not knowing amount of HF in bottle.

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GENERAL CHEMICAL COMPANY ...FIRST IN FLUORIDES

565,059. **Resinous Condensation Products.** British Thomson-Houston Co., Ltd.

# MACHINERY

## United States

2,361,369. **Apparatus to Form a Reticulate Structure from a Cold-Drawable Thermoplastic.** J. J. Grebe and E. H. Harder, assignors to Dow Chemical Co., all of Midland, Mich.

2,361,950. **Apparatus to Smooth and Level Thermoplastic Coating Material Deposited on a Sheet or Web Surface.** R. B. Leech, assignor to Standard Process Corp., both of Chicago, Ill.

2,362,180. **Machine for Applying Tread Rubber to Tires.** R. O. Wilson, assignor of one-third to A. A. Behm and one-third to L. A. Irish, all of Los Angeles, Calif.

2,362,469. **Apparatus for Injection Molding Plastic-Like Material.** W. P. Cousino, Detroit, assignor to Chrysler Corp., Highland Park, both in Mich.

2,362,583. **Apparatus for Injection Molding.** R. P. Piperoux, Radburn, N. J., assignor to Celanese Corp. of America, a corporation of Del.

2,362,659. **Apparatus and Method for Curing V-Belts.** N. W. Miller, assignor to Wingfoot Corp., both of Akron, O.

2,362,967. **Tire Groover.** E. L. Bivans, assignor to A. B. Cleveland, both of Los Angeles, Calif.

2,363,261. **Extrusion Die Assembly.** G. Ritter, Millington, N. J., assignor to The Ruberoid Co., New York, N. Y.

2,363,900. **Two-Piece Mold for Molding Plastic Material.** A. L. Pugh, Jr., Bala-Cynwyd, assignor to International Resistance Co., Philadelphia, both in Pa.

2,364,020. **Apparatus and Method of Producing Hollow Rubber or Plastic Articles.** J. E. L. Ryan, Larchmont, N. Y.

2,364,026. **Apparatus and Method of Making Sponge Rubber Cushions, Etc.** J. A. Mackay, Barberton, and C. H. Nagel, Akron, assignors to Sun Rubber Co., Barberton, both in O.

## Dominion of Canada

423,006. **Calender for Forming Plastic Sheets.** Carbide & Carbon Chemicals, Ltd., Toronto, Ont., assignee of D. Domizi, Parma, O., U. S. A.

423,188. **Apparatus for Coating Strands with a Highly Viscous Plastic Material.** Western Electric Co., Inc., New York, N. Y., U. S. A., assignee of E. E. Newton, Montreal, C. A. Peachey, Westmount, and F. R. Reevely, St. Lambert, all in P. Q.

423,407. **Mold for Curing Inner Tubes or Other Inflatable Rubber Articles.** Dill Mfg. Co., Cleveland, assignee of J. C. Crowley, Cleveland Heights, both in O., U. S. A.

423,409. **Stem Connection for Curing Molds for Inner Tubes or Other Inflatable Rubber Articles.** Dill Mfg. Co., Cleveland, assignee of J. C. Crowley, Cleveland Heights, both in O., U. S. A.

423,468. **Apparatus for Vulcanizing Long Lengths of Belting.** Wingfoot Corp., assignee of K. B. Kilborn, both of Akron, O., U. S. A.

423,472. **Apparatus for Full Curing V-Belts, Etc.** Wingfoot Corp., assignee of N. W. Miller, both of Akron, O., U. S. A.

423,564. **Apparatus for Handling Elastic Filament.** Sylvania Industrial Corp., assignee of J. M. Leach, both of Fredericksburg, Va., U. S. A.

423,574. **Shaping Mold for Setting and Vulcanizing Foamed Latex.** United States Rubber Co., New York, N. Y., assignee of E. A. Luxenberger and H. C. Erich, both of Mishawaka, and M. M. Cunningham, South Bend, both in Ind., both in the U. S. A.

423,657. **Die for Molding Plastic Flashlight Bodies.** Gits Molding Corp., assignee of J. A. Gits, both of Chicago, Ill., U. S. A.

423,682. **Apparatus for Shaping Organic Thermoplastic Compound.** Plax Corp., Hartford, assignee of J. Bailey, West Hartford, both in Conn., U. S. A.

## United Kingdom

564,002. **Apparatus for Consolidating Joints in Rubber Tubes or the Like.** Dunlop Rubber Co., Ltd., and G. R. Mead.

564,063. **Tire Building Apparatus.** Wingfoot Corp.

564,130. **Tire Repairing Apparatus.** Dunlop Rubber Co., Ltd., and T. Norcross.

564,279. **Injection Molding Machines.** E. M. B. Co., Ltd., L. A. Catlin, and W. H. Cockerill.

564,350. **Machine for Extruding and Blowing Organic Plastic Materials.** L. Mellersh-Jackson.

564,534. **Machine for Stripping Rubber Tread Blocks from Rubber Treaded Links, Etc.** A. H. Stevens (Burgess-Norton Mfg. Co.).

565,071. **Apparatus for Selectively Softening an Area of a Thermoplastic Arch Support.** W. M. Scholl.

# UNCLASSIFIED

## United States

2,362,061. **Tire and Wheel Separating Apparatus.** M. H. Ewing, Sabetha, Kan.

2,362,626. **Cable Tensiometer.** H. D. Giffen, Pico, assignor to Consolidated Vultee Aircraft Corp., San Diego, both in Calif.

2,362,883. **Air Pressure Signaling System.** W. E. Cecil, High Point, N. C.

2,362,949. **V-Belt Fastener.** C. W. Tingley, Milwaukee, and W. P. Reilly, Menomonie Falls, both in Wis.

2,363,043. **V-Belt Fastener.** V. R. Clark, Chicago, Ill.

2,363,182 and 2,363,183. **Vehicle Wheel and Rim.** J. H. Hunt and H. J. Horn, assignors to Motor Wheel Corp., all of Lansing, Mich.

2,363,277. **Adhesive Material Dispenser and Applier.** A. A. Anderson, Rose Township, assignor to Minnesota Mining & Mfg. Co., St. Paul, both in Minn.

2,363,717. **Preserving a Rubber Article from Oxidation by Inflation and Injection of a Slug of a Volatile Oxidation Inhibitor into the Article.** I. L. Wolk, Bartlesville, Okla., assignor to Phillips Petroleum Co., a corporation of Del.

2,363,964. **Extensometer for Measuring the Extension up to and at Breaking Point of a Loaded Test Piece of Rubber or Like Elastic Material.** A. V. Howson and N. S. Reed, assignors to Callender's Cable & Construction Co., Ltd., all of London, England.

2,363,998. **Tire Chain Connector.** W. R. Royer, Wilkes-Barre, Pa.

## Dominion of Canada

423,071. **Anti-Skid Device.** G. Faulds, Philadelphia, Pa., U. S. A.

423,256. **Apparatus for Stripping Plastic Insulation, Etc. from the Ends of Insulated Wire.** Canadian Industries, Ltd., Montreal, P. Q., assignee of C. R. Johnson, Glenn Mills, Pa., R. R. Nydegger, Wilmington, Del., and N. C. Wyeth, Paterson, N. J., all in the U. S. A.

423,471. **Expansible and Contractible Metal Ring.** Wingfoot Corp., assignee of C. E. Zarth, both of Akron, O., U. S. A.

423,802 and 423,803. **Belt Connector.** Dayton Rubber Co., assignee of E. H. Kremer, both of Dayton, O., U. S. A.

424,010 and 424,011. **Device for Checking the Operation of a Molding Press for Plastic Articles.** F. J. Stokes Machine Co., assignee of W. Strauss, both of Philadelphia, Pa., U. S. A.

424,032-424,034. **Anti-Skid Chain.** H. J. and R. A. Nagle, assignees of N. H. Copp, all of Rochester, N. Y., U. S. A.

## United Kingdom

564,067. **Road Rims for Wheels of Agricultural Tractors, Etc.** H. Best.

564,159. **Pressure Gages.** C. R. A. Grant.

564,175. **Tire Valve Connectors.** W. Turner.

564,515. **Couplings for Flexible Pipes.** J. C. Williams and I. S. Winby.

# TRADE MARKS

## United States

409,678. Representation of vertical black rectangle containing in the lower half waving white parallel lines, and in the upper half the letters: "P", "E", and "H." Synthetic resinous materials. Rohm & Haas Co., Philadelphia, Pa.

409,755. **Cordo-Bond C.** Adhesives. Cordo Chemical Corp., Norwalk, Conn.

409,813. **Rayprene.** Rubber apparel for protection against X-rays, Picker X-Ray Corp., New York, N. Y.

409,819. **Ubatol.** Plasticized polystyrene dispersion for pigment finishes for leather. Union-Baystate Co., Inc., Cambridge, Mass.

409,838. **Cuprax.** Accelerators. Goodyear Tire & Rubber Co., Akron, O.

409,846. **Sylplast.** Synthetic resins. Sylvan Plastics, Inc., New York, N. Y.

409,962. Representation of a winged sandal and the word: "**Goodyear.**" **Printers' supplies. Goodyear Tire & Rubber Co., Akron, O.**

410,057. **G. U.** Container of prophylactics. J. Schabelitz, doing business as Schabelitz Research Laboratories, San Diego, Calif.

410,089. Representation of one narrow orange stripe and two narrow green stripes. Belting. Victor Balata & Textile Belting Co., New York, N. Y.

410,187. **Texfoam.** Material in upholstered furniture. Sponge Rubber Products Co., Derby, Conn.

410,192. Representation of rectangle containing the word: "**Flexocast.**" Elastic dressing for medical appliance. Physicians & Hospitals Supply Co., Inc., doing business as Ulmer Pharmacal Co., Minneapolis, Minn.

410,200. Representation of black vertical rectangle containing an oblique band with the word: "**Medco.**" Prophylactics. Medicated Products Co., Chicago, Ill.

410,297. Representation of a black octagonal seal containing at the bottom the words: "**Trade Mark,**" and two simulated "**Z's**" joined at a point near the top by a "t." Synthetic resins, emulsions, and rubber and plastic compositions. **Resinous Products & Chemical Co., Philadelphia, Pa.**

410,341. **Flotone.** Carbon black. **Peerless Carbon Black Co., Pittsburgh, Pa.**

410,381. **Lesamite.** Filler. Thompson, Weinman & Co., Inc., Cartersville, Ga.

410,440. Representation of the goods concerned and the words: "**Flex-Abrasive.**" Abrasive articles. **Flex-Abrasive Co., Chicago, Ill.**

410,455. **Whelco.** Druggists' sundries. United Cigar-Whelan Stores Corp., New York, N. Y.

410,477. **Korex.** Admixture of rubber and cork. Ben Goldware, Omaha, Nebr.

## Rims Approved and Branded for Tire & Rim Assn., Inc.

| Rim Size | Nov. 1944 |
|---|---|
| 15" & 16" D. C. Passenger | |
| 16x4.00E | 102,822 |
| 16x4.25E | 3,211 |
| 16x4.50E | 31,347 |
| 15x5.00F | 3,076 |
| 16x5.00F | 14,590 |
| 15x5.50F | 9,165 |
| 16x4.00E—Hump | 1,740 |
| 15x6½L | 796 |
| 17" & Over Passenger | |
| 18x2.15B | 7,589 |
| Flat Base Truck | |
| 20x3.75P (5") | 2,503 |
| 20x4.33R (6") | 28,342 |
| 15x5.00S (7") | 16,959 |
| 20x5.00S (7") | 364,998 |
| 15x6.00T (8") | 909 |
| 20x6.00T (8") | 48,733 |
| 22x6.00T (8") | 12,669 |
| 18x7.33V (9/10") | 476 |
| 20x7.33V (9/10") | 47,002 |
| 22x7.33V (9/10") | 118 |
| 24x7.33V (9/10") | 11,695 |
| 19x8.37V (11") | 86 |
| 24x8.37V (11") | 940 |
| 20x10.00W | 847 |
| 24x10.00W | 1,402 |
| Semi D. C. Truck | |
| 16x4.50E | 3,003 |
| 16x5.50F | 1,271 |
| Tractor & Implement | |
| 15x3.00D | 17,150 |
| 16x3.00D | 108 |
| 19x3.00D | 6,006 |
| 17x3.25E | 199 |
| 20x4.50E | 684 |
| 30x4.50E | 401 |
| 18x5.50F | 7,365 |
| 20x5.50F | 702 |
| 20x8.00T | 1,996 |
| 24x8.00T | 6,348 |
| 28x8.00T | 2,971 |
| 32x8.00T | 302 |
| 36x8.00T | 998 |
| 40x8.00T | 108 |
| W8-24 | 10,798 |
| W8-28 | 92 |
| W8-36 | 485 |
| W9-38 | 3,435 |
| W10 28 | 110 |
| DW9-38 | 16,391 |
| DW10-38 | 809 |
| DW11-28 | 923 |
| DW11-38 | 1,839 |
| TOTAL | 796,509 |

NEVILLE

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## NEVOLL*

Coal-tar softener, formerly widely used in natural rubber, now found to be an effective plasticizer and wetting agent for GR-S to improve resistance to abrasion, tensile strength, elongation and resilience.

## COUMARONE RESINS

A number of Rubber Reserve Company's releases on compounding synthetic rubbers contain suggested recipes calling for coumarone resins. They are available in various melting points and colors.

## DIBUTYL PHTHALATE

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**Non-Slip Finish Rubber Gloves**

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WATERPROOFED metal slide fasteners have recently been made possible by the development of a rubber construction known as the pressure sealing zipper. Rubber lips which overlap the fastener have initial pressures built into them that insure a perfect seal against any pressure that the structural strength of the slide fastener will withstand. Placed on the outside, the rubber lips make the article waterproof and prevent the entrance of gases. Used on the inside, they prevent the escape of gases or liquids held within. The pressure sealing zipper can be applied to sheet rubber, metal, and fabric. Installation is accomplished by either stitching or cementing, depending on the application. The pressure seals are effective in a wide temperature range. Samples tested did not crack at -70° F., or become soft at 150° F. Weathering and aging characteristics are said to be good. The sealing lip construction conforms to changes in position of the sealing wall, withstanding stresses caused by these movements. Applications include closures for numerous items of personal and industrial equipment. The B. F. Goodrich Co.

**Pressure Sealing Zipper**

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**Cartridge-Type Respirator**

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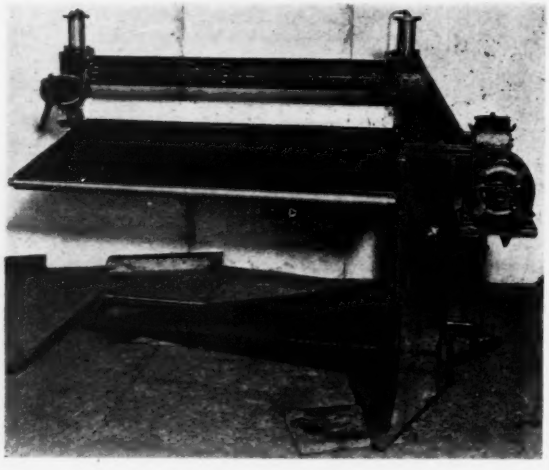

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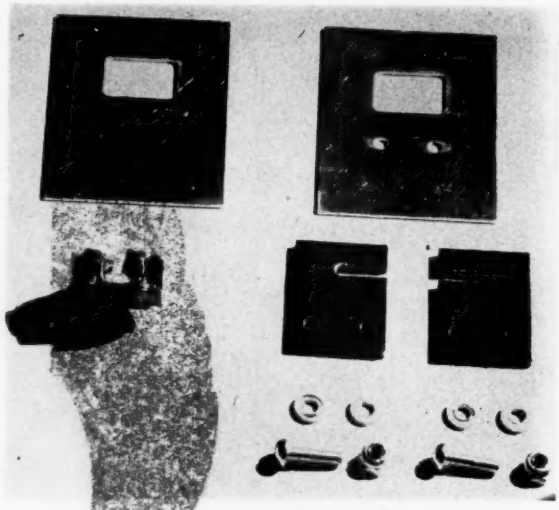

New (Left) and Old Types of Airplane Cable Fairleads

to two to 10 minutes for the present 26.2-gram type consisting of bolted phenolic laminated plates. It is known as the Cycle-Weld snap lead. Two tiny rubber strips, which serve the dual purpose of holding two companion plastic pieces together and of providing an elastic grip as the lead is snapped into panel slots, are held in place at four opposite points by a cement binding. Pressed firmly with the thumb, the lead is snapped into panel openings after the control cable has been inserted into the lead through holes formed on one side of the lead while the rubber strips are relaxed. Two tiny ridges—at the top and bottom of the snap lead—grip the edges of the panel slots. Tension set up by the rubber strips sets and holds the leads in place. When pressed into position, the two plastic pieces form a single unit containing a small hole through which the flexible metal leads, or cables, pass from various controls of the plane to the pilot's cabin. Cycle-Weld Division of Chrysler Corp.

---

Data for 1943 indicate that Brazil produced 460,000 pneumatic tires and 300,000 tubes in that year. Tire output for 1944 is expected to run between 460,000 and 500,000 units. Most of the tires and tubes are used locally, but Brazil has been exporting increasing quantities of these goods and in the first quarter of the current year shipped 30,000 tires and more than 21,000 tubes. Export quotas for the second quarter of 1944 were fixed at similar figures.

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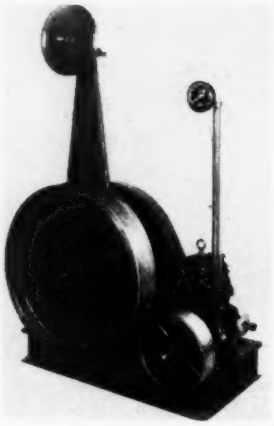

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# FAR EAST

## CEYLON

Advisory Circulars Nos. 20, 21, and 22 covering "Recommended Planting Material (1944)," "The Control of Bark Rot and Canker Bark Rot," and "*Oidium* Leaf Disease," respectively, have just been received from the Rubber Research Scheme (Ceylon).

The first offers striking proof—if any were still needed—of the influence of environment on the growth and yields of individual clones. The recommended material is divided in three groups. Clones of Group A have been tapped in Ceylon, have proved satisfactory, and are recommended for planting on a large scale. Included are the Dutch clones Tj. 1 and Tj. 16, the Malayan clones Glenshiel 1 and Prang Besar 86, and the Ceylon clones Wagga 6278 and Millikande 3/2. Of these Tj. 1 is the most popular; it is high-yielding and vigorous, but should preferably be used in wet, low-country as yields tend to decline, and brown bast to increase in drier districts. Tj. 16, on the other hand, is recommended for drier areas, and elsewhere only where experience shows it has local suitability. This clone is less vigorous than Tj. 1 and is liable to be severely attacked by *Oidium*. Glenshiel 1 requires a good soil and, as it is susceptible to brown bast, lighter than 100% tapping systems are advised.

PB. 86, a fairly vigorous clone, is more resistant to *Oidium* than the three clones just named. It is a good yielder and is recommended for large-scale use in all districts. MK 3/2, like Tj. 1, is a vigorous grower. Its chief defect is a marked susceptibility to canker of the renewing bark; however this disease is readily controllable by suitable treatment. MK 3/2 is also chiefly recommended for use in the wet low-country, and elsewhere on a small scale. Wagga 6278 gives best results in good soil in the wet low country, when growth may equal that of Tj. 1 and MK 2/3. At the Nivitigalakele experimental gardens it has given outstanding yields.

Clones of Group B were recommended for use on a large scale in other countries, but have not been tapped in Ceylon, or only on a small scale. They include PR. 107, AV. 255, Waringiana 4, and Pilmoor B. 84. Ceylon planters are advised to use these on a small scale (not more than 10% of any one clone).

Group C clones are promising Ceylon or imported clones about which, however, not enough is yet known to justify their use on more than a small or experimental scale. Clonal seedlings of all types are also included in Group C. Since it is only by trial that the value of new material can be tested, estates are strongly advised to set aside small areas or testing gardens for this material, for it may well happen that clones and seedling families of Groups B and C include some that may turn out better than the material now in general use.

One of the oldest Java clones, Bodjong Datar 5, is no longer recommended; its yields on some estates are good, but are usually below those of Tj. 1; furthermore BD 5 is liable to bark bursts and bark rot.

Finally, as there is some evidence that yields are increased if the scion is budded on to vigorous stocks of superior potential yield, it is advised to use available illegitimate seeding families and well-mixed clonal seedlings as stocks.

Circular No. 21, on bark rot, discusses the causative agents, the symptoms, and the methods of controlling the different types of diseases of the tapping panel as bark rot, claret-colored canker, and a disease lately reported at the Nivitigalakele experiment gardens and diagnosed as canker of the newly tapped panel, apparently like the other two, caused by some species of *Phytophthora*.

The *Phytophthora* diseases are most prevalent in the wet low-country districts; it is not surprising therefore that in Ceylon, with its long wet season, clones should suffer more from these diseases than in the other important rubber countries and that in at least a few cases latent susceptibility should show up in Ceylon in imported clones which have no record of susceptibility in their countries of origin. Of the clones recommended for large-scale planting, the imported clones Tj. 16, Gl. 1 and PB 86 have so far shown no susceptibility to *Phytophthora* disease, but neither is there any indication of complete resistance. Tj. 1, with its heavy canopy of foliage which prevents rapid drying of the bark, has on occasion been heavily attacked by bark rot.

Present evidence indicates that a clone susceptible to one type of *Phytophthora* will also be attacked by other forms.

Thus MK 3/2, which is liable to *Phytophthora* die-back, also suffered—more than other clones in fact—from the canker of the newly tapped panel referred to above.

Circular No. 22 discusses *Oidium* leaf disease, the powdery mildew which causes abnormal leaf-fall in young leaflets during refoliation and distorts and crinkles older leaves. Severe leaf-fall due to *Oidium* lowers yields, but, still worse, retards bark renewal and exhausts bark reserves, if the attacks occur repeatedly; while young trees also become very susceptible to attack from *Diplodia* die-back.

Outbreak of *Oidium* was mild in 1940-42, but unusually severe again in 1943 and 1944; in fact in the latter year damage due to *Oidium* was reported on low-country estates not previously affected.

Sulphur-dusting, if applied in time and if enough sulphur is used, continues to be the best means of combating the disease. Attempts to prevent *Oidium* attacks by manuring gave no satisfactory results. In one case this treatment caused late wintering, thus leading to increased *Oidium*. On the other hand manuring is held to be of value in assisting trees to recover from the effects of *Oidium*, particularly on low-country estates where there is less defoliation.

# INDIA

A recent amendment to the Rubber Control and Production Order of 1942 authorizes the Rubber Production Commissioner and the Controller to requisition rubber stocks that have been unduly withheld by owners of approved estates and holdings, approved or licensed dealers, or other persons. No rubber at all may be held by anyone except owners or occupants of estates or holdings, approved dealers or manufacturers.

A Rubber Manufactures Control Order, 1944, effective September 1, subjects the treatment, use, or consumption of all types of raw, synthetic, or reclaimed rubber to license or special or general order from the Rubber Controller.

The sale of the estates of the Travancore Rubber Co. has been completed, and the company will now go into voluntary liquidation. The estates in Travancore, which cover 3,614 acres, of which 2,149 acres are under rubber (1,622 acres of which are mature) and 630 acres under tea, have been sold to J. H. Vavasseur & Co., of Ceylon House, London, for £219,000. The estate titles are to be transferred to Aspinwall & Co., of Travancore, which recently also acquired the estates of the Central Travancore Rubber Co. and the Vellani Tea Estates.

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. . . no guessing with the Cambridge Surface Pyrometer on the job. The careful following of temperature schedules in working both natural and synthetic rubber is a necessity in producing a uniform product. A dependable instrument for determining surface temperatures of rolls is of course essential. The Cambridge Roll Pyrometer is accurate, sturdy and quick-acting. It is so convenient to use that workers will use it consistently. Write for descriptive bulletin.

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ROLL • NEEDLE • MOLD
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"Automatic" manufactures and installs a complete line of fire protection devices and systems for all types of fire hazards. Write for complete information—we'll furnish it cheerfully.

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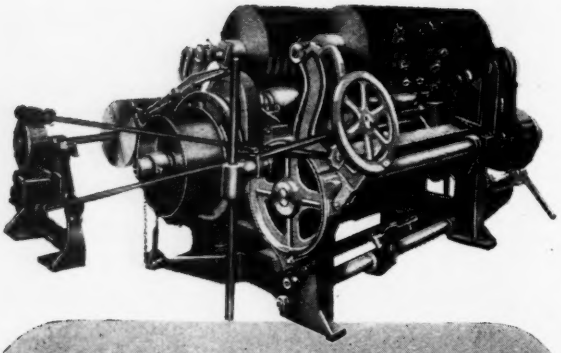

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News of the recent opening of the works of National Rolling Mills, Ltd., near Calcutta, calls attention to the fact that India has for some time been producing insulated cables, for the new plant is to produce chiefly copper rods for the electrical industry, and part of the output is destined for a sister concern, National Insulated Cable Co. of India, Ltd. The latter firm operates one factory in the Central Provinces and will shortly begin production in a new factory near the rolling mills. Both the rolling mills and the cable factory are under the management of the Associated Industrial Development Co.

British equipment has been installed in the cable factory, and British experts are to supervise production. S. F. Nicholls, formerly of Derby Cables, Ltd., England, is supervising the installation of cablemaking equipment which will produce all kinds of rubber and vinyl chloride cables, enameled, cotton, and silk covered wires. Works manager will be C. C. Gorton, formerly of Cable Planning, Ministry of Supply.

The Indian Government is considering the possibility of opening on a permanent basis central scientific offices for mutual cooperation, in London and Washington and if possible, eventually also in Moscow. Hitherto the government has spent comparatively little on scientific research in India, but now plans to establish well-equipped national research laboratories there. With these projects in view a party of distinguished Indian scientists has been visiting England and will also proceed to the United States. They wish to see how research laboratories are run in the two countries and also to ascertain the facilities they might be able to offer for training teams of Indian workers in science and technology. Furthermore the possibility is being considered of attracting to India foreign technical talent in the initial stages of the planned development of industries and of industrial and scientific research generally.

From a different source it is learned that the Government of the State of Travancore in South India, is contemplating postwar expansion of the local rubber manufacturing industry. This state, incidentally, is the leading rubber producer in India.

# LATIN AMERICA

## HONDURAS

In the Lancetilla Valley in Honduras a central cooperative station for the multiplication and distribution of superior *Hevea* planting material has been established following investigations carried out during the latter part of 1940 by a group of specialists from the United States Department of Agriculture. This valley was selected because it seemed to offer the best soil and climatic conditions, and it had the further advantage that an experiment station and plant introduction garden had already been established there in 1926 by the United Fruit Co. This early project also included *Hevea*, and the 1940 investigators found several hundred well-grown trees still flourishing. It was seed from these trees in addition to large quantities of budded stumps of superior clones from the Philippine Islands that were used by the new cooperative station for nursery plantings. Multiplication was so successful that from 1942 to 1944 about 140,400 budded stumps, 16,400 meters of budwood, 678,500 seeds, and 25,000 seedlings could be distributed to 11 Central and South American countries. The new station also supplied 386 pounds of cover crop seeds. On Honduras itself, commercial field plantings now cover 626 acres.

## COLOMBIA

The development of demonstration plantations of *Hevea* rubber in Colombia, a joint undertaking initiated by the United States and Colombian Governments in 1940, is reported to be progressing

favorably despite various obstacles. For, once again, as elsewhere in South America, efforts to develop and expand rubber resources were seriously hampered by the lack of roads and transportation facilities plus poor health and living conditions of workers, and again it was necessary first to commence to supply the deficiencies and to lay the groundwork for better and healthier living for labor before the actual work of clearing terrain and planting could begin. Now all phases of the work in hand are apparently proceeding in a satisfactory manner.

As a result of a supplementary agreement signed by the United States and Colombian Governments in 1943, according to which three central plantations of 1,250 acres each were to be established in the best rubber-growing areas in the country, nurseries were established at Acandi, Turbo, Rio Grands, Apartado, and Villa Arteaga. The last-named site has also been selected to be headquarters of the rubber plantation program.

One thousand acres had been cleared, and 450 acres planted by the middle of October, 1944, and it was expected that by the end of the year 1,000 acres would have been planted. Once the initial hurdles have been cleared, progress should be increasingly rapid.

# LATIN AMERICAN NOTES

Reports of rubber-collecting activities in Latin-America are not uniformly favorable. Ecuador reports state that despite excellent prices, prospects for increased rubber production in 1944 are not bright, as no new stands of rubber trees have been discovered in the Esmeraldas rubber producing areas.

During October, Ecuador exported 1,190,160 pounds of rubber to the United States, making the total for the first ten months of the year 4,628,400 pounds.

In El Salvador the wild rubber crop in 1943 was only slightly more than enough to cover domestic needs. At the same time it is learned that little headway was made with the commercial planting of rubber last year.

In 1943, Nicaragua shipped out all rubber produced locally except 1%, which was retained for domestic purposes. During July, 1944, it shipped 250,000 pounds. In October, 1944, however, the figure was only 175,000 pounds. Future shipments should be greatly aided by six airplane landing strips under construction in the eastern section of Nicaragua and destined chiefly for use in the procurement of crude rubber.

Nicaraguan rubber is obtained chiefly from wild *Castilloa* trees. But if present plans succeed, the country will some years hence be able to ship *Hevea* plantation rubber. About 500,000 *Hevea* seedlings are now growing in nurseries in the country and will eventually be planted out on various farm sites. An agricultural experiment station has been established at El Recreo by the United States in cooperation with the Nicaraguan Government. Technical experts from the United States arrived in 1943, and a variety of products are being developed, including rubber.

In Peru prospects for rubber in April and May, 1944, were also said to have been quite favorable despite the highest floods in the Peruvian Amazon in 20 years. Because of the satisfactory situation regarding food and supplies, early tapping could be undertaken; while improved transportation facilities and better-trained crews further aided the collection of rubber. A new supply road was opened between Inapara in Northern Madre de Dios and Cobija, Bolivia.

The tire situation in Maracaibo, which some months ago was reported serious, has been somewhat relieved by the activities of a tire recapping plant established about a year ago. The tires are recapped with synthetic rubber, and in this way, it is said, at least six months have been added to the life of many tires. A tire factory in Caracas was able to send some tires to Maracaibo, and a certain number also arrived from Brazil, which further helped ease the very grave shortage.

Industria Nacional de Neumaticos S. A., a new tire factory located about six miles south of Santiago, began operations in September, 1944. It is capitalized at 32,000,000 pesos ($1,320,000) in 320,000 shares, of which 200,000 are held by the Fomento Corp., 40,000 by a United States company, and the remainder by private individuals. The company, which eventually expects to employ 180 persons, is at present producing chiefly truck and bus tires and only a limited number of tires for passenger cars. It is calculated that present rubber stocks are sufficient to cover Chile's minimum essential tire requirements in the first quarter of 1945. The tires and tubes produced are to be rationed by the government just as imported tires are already being handled.

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The instrument is simple in design . . . rugged in construction . . . practically without wearing parts . . . adjustable to any thickness. Originally used for rubber, it has taken over just as deftly for synthetic rubber, plastics, cellulose, and other media. No matter what the article, your coating must be thick enough, but not even 1/1000″ too thick, or the war effort suffers irreparable loss. No matter what the material, you've got to s-t-r-e-t-c-h it as far as possible — and "possible" daily proves to have a new, elastic meaning.

Better investigate the Schuster Magnetic Calender Gauge at once, with or without automatic control. Every installation has to be engineered to the job . . . Please *give us time to do it right.*

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# Editor's Book Table

## BOOK REVIEWS

**"Commercial Methods of Analysis."** Foster Dee Snell and Frank M. Biffen. International Chemical Series. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 18, N. Y. 1944. Cloth, 8½ by 5¼ inches, 760 pages. Index. Price $6.

Clear, concise, and dependable methods for the practical analysis of numerous commercial products currently used appear in this recently published volume. Methods given are those which a commercial laboratory will find practical for considerations of economy and time without the sacrifice of the reliability of results. They are, for the most part, standard methods such as those approved by the American Society for Testing Materials and other chemical societies. Standard methods are not always described completely, and some have been simplified; but explanations of steps, the reasons for which are not immediately clear, have been added. Methods, other than standard and shorter, are sometimes given. An important feature of the book is its presentation of a method of approach to the analysis of complex commercial products, many of which provide inexperienced chemists with difficulties.

Two chapters are devoted to rubber. Qualitative and quantitative analyses, largely according to A.S.T.M. methods, are outlined. There are tests for determination of rubber hydrocarbon, rubber as compounded, artificial aging, determination of copper and manganese, analysis of latex, tests for gutta percha and balata, and identification of various types of accelerators. No tests are given for the synthetic rubbers, but there is a brief discussion of their similarities with and differences from natural rubber.

Other chapters contain analytical procedures for sulphur and its compounds, solvents and thinners, synthetic resins, pigments, extenders, mineral fillers, oil and wax emulsions, and other chemicals.

**"The Design of Manufacturing Enterprises."** Walter Rautenstrauch. Pitman Publishing Corp., 2 W. 45th St., New York, N. Y. Cloth, 6 by 9¼ inches, 308 pages. Index. Price $3.50.

Written for use by engineers in industry as well as by engineering students, this volume elucidates the essential principles and methods of economic calculations employed in the efficient designing and redesigning of manufacturing enterprises. The author is a member of the department of industrial engineering at Columbia University. Through clear discussions and examples chosen from well-known process and mechanical manufacturing concerns he presents rational methods of design directed toward the production of goods at favorable or optimum costs. Authoritatively and concisely, Mr. Rautenstrauch considers the design of products, the design of methods of manufacturing and the selection of machinery and equipment, design of the organization for manufacturing and for marketing and the methods of their management and control; design of the organization of the business as a whole for integration of production, marketing, and finance; and design of the capital structure. His broad, practical experience in designing new businesses, redesigning parts of existing businesses, and redesigning entire businesses to put them on a profitable basis has been freely drawn upon, and this wide experience and familiarity become in the discussion an authentic guide for current and future problems of design. The first part of the book deals with business as a whole; the second with selected problems. Tables, charts, full layouts, and other essential data amplify the text.

**"The Oxy-Acetylene Handbook.** A Manual on Oxy-Acetylene Welding and Cutting Procedures." The Linde Air Products Co., New York 17, N. Y. Cloth, 9½ by 6¼ inches, 600 pages. Index. Price $1.50.

This manual, which will serve as a classroom text in vocational and trade schools, technical high schools, and engineering colleges and also a guide for self-instruction, covers the entire range of the oxy-acetylene process. It gives clear, easy to follow instructions for handling all the common commercial metals, together with simple explanations of the fundamental principles of the various methods of depositing and controlling molten metal. Considerable space is devoted to an explanation of the operating principles of oxy-acetylene equipment and instructions for its care and maintenance. "The Oxy-Acetylene

Handbook" is also a useful reference book for engineers, designers, plant management, and superintendents and foremen in shops where oxy-acetylene welding and cutting are used or might be used as either a production or maintenance tool.

## NEW PUBLICATIONS

**"Heat Resistant GR-S."** Booklet No. 6. R. T. Vanderbilt Co., Inc., 230 Park Ave., New York 17, N. Y. 4 pages. This booklet gives heat aging data for two sulphurless compounds. The compound vulcanized with Ethyl Tuads had better elongation and tensile than the one vulcanized with Selenac, but both showed good heat resistance.

**"Research Laboratory Dedication."** Midwest Rubber Reclaiming Co., East St. Louis, Mo. 16 pages. Photographs of the reclaimed rubber laboratory and of its dedication day activities are contained in this commemorative booklet.

**"Conveyer and Elevator Belting."** Thermoid Co., Trenton 6, N. J. 8 pages. This catalog describes neoprene and GR-S conveyer and elevator belts for all standard installations. Hot material belts, canners' belt, grain conveyer belts, and grader belt as well as several lines of various constructions depending upon load conditions are included.

**"Rubber, Polyisoprenes, and Allied Compounds.** Part VII, Action of Nitric Acids Thereon." G. F. Bloomfield and (in part) G. A. Jeffrey. Publication No. 49 of The British Rubber Producers' Research Association, 19 Fenchurch St., London, E.C.3, England. 6 pages. This paper, reprinted from Volume 120 (1944) of the *Journal of the Chemical Society,* reports that the reaction of nitric acid with rubber and some olefins presents characteristics of a free-radical, chain reaction. The nitrogen atom was generally directly linked to carbon in the products, and it was found that the molecular ratio of combined oxygen is in excess of 1:1. Where nitro-compounds were isolated, substitution or addition of $NO_2$ or $N_2O_2$ seemed to take place at the ethylenic carbon atoms.

Bulletins of E. I. du Pont de Nemours & Co., Inc., Wilmington, Del. **"Neoprene Latex Adhesives for Use with Nitrocellulose Coated Materials"** (BL-170), 3 pages; **"Neoprene Type KNR"** (BL-171), 27 pages; **"Neoprene Latex Types 571 and 572 in Leather Finishes"** (BL-174), 3 pages; **"Neoprene Solid Tires"** (BL-175), 5 pages; **"Neoprene No-Mark Soles"** (BL-176), 4 pages; **"Polyac Activated GR-I Inner Tubes"** (BL-177), 6 pages; **"MBTS as a Retarder Activator for Thionex in GR-S Stocks"** (BL-179), 5 pages; **"Flame Proofing (Neoprene vs. Rubber)"** (BL-180), 11 pages; **"pHR in Neoprene Latex Compounding"** (BL-181), 4 pages.

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(FOR FURTHER DETAILS, SEE AD ON PAGE 382)



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**It may be your type of manufacture has not required the use of treated liners. However, such liners as you do use eventually have to be replaced.**

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Data Sheets for the Hycar Blue Book. The Hycar Chemical Co., 335 S. Main St., Akron 8, O. Included in this recently released material are the following: **"Effect of Varying Amounts of Stearic Acid on Cure, Hycar OR-25," "Pigmentation-Hycar OR-25," "Hose with a Hycar-OR25 Tube and GR-S Friction and Cover Stock,"** and several Army and Navy specifications for Hycar compound stocks.

**"Ace Rubber Protection."** Catalog No. 300-4. American Hard Rubber Co., 11 Mercer St., New York, N. Y. 64 pages. Products for handling corrosive solutions including rubber linings, lined tank cars, lined steel pipes, valves and pumps, hard rubber pipes, utensils and specialties, synthetic rubber linings, and rubber and synthetic latex coatings are described in this illustrated catalog. Diagrams, charts, and tables as well as photographs of corrosion resistant equipment for the chemical process industries visualize applications of the products listed.

**"Dutrex 20 and 25,** Plasticizers for Vinyl Chloride Resins." Report No. 5-8670. Shell Development Co., Emeryville, Calif. 15 pages. Illustrated with charts, this bulletin discusses the properties imparted to vinyl chloride resins by two highly aromatic hydrocarbon products derived from petroleum. They have different viscosities and boiling ranges. When used alone, the Dutrexes are stiff and have a tendency to sweat. Blending with tricresyl phosphate is therefore recommended by the producers.

**"The Storage of Isobutylene."** Research Bulletin No. 7.401-B. Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa. 40 pages. This research bulletin discusses factors important in the economic storage of isobutylene and the variables which affect the cost of storage. Recommendations and cost data are included. Facts are given to support the conclusion that the best storage temperature is about 32° F., with a corresponding working pressure of about four pounds p.s.i. gage. The history of isobutylene, methods of its preparation, and physical and chemical properties are summarized. Charts and tables, and 68 references to American and foreign literature supplement the discussion.

**"Chicago Rubber Group, 1945 Year Book."** Chicago Rubber Group, Chicago, Ill. 44 pages. Committees, members and the by-laws of the organization are given in this booklet as well as a variety of tabulated information on synthetic rubbers, carbon blacks, and rubber-testing instruments.

**"The Early Years."** American Petroleum Institute, 50 W. 50th St., New York 20, N. Y. 12 pages. This illustrated anniversary brochure, issued on the occasion of the eighty-fifth birthday of the petroleum industry, August 27, 1944, describes the colorful period of pioneering that followed the drilling of the first well, and the men who participated in the advancement of the industry.

**"Goodyear on the Job."** The Goodyear Tire & Rubber Co., Akron, O. 20 pages. Brief textual notes and striking photographs describe the production and use of off-the-road tires in this recent publication.

**"Plastics Stock Molds."** Revised Edition. Compiled by stock mold department, *Modern Plastics Magazine*, 122 E. 42nd St., New York 17, N. Y. 180 pages. Price $5. This illustrated catalog contains all current stock injection and compression molds for plastics and includes extruded cross-sections and laminated sheets, rods, and tubes. Each item has an identifying number, which is indexed numerically. The indices give the name of the molder, extruder, or laminator.

**"Victory for Freedom."** National Association of Manufacturers, 14 W. 49th St., New York 20, N. Y. 16 pages. **"Postwar Marketing."** T. G. MacGowan, (Firestone Tire & Rubber Co.), Bankers Trust Co., 16 Wall St., New York 15, N. Y. 16 pages. **"The Course of Autoxidation Reactions in Polyisoprenes and Allied Compounds. Part VIII. The Photo-oxidation of Methyl-Elaidate—Geranylamine."** D. A. Sutton. **"On the Calculation of Certain Higher-Order Bethe Approximations."** W. J. C. Orr. Publications No. 51 and 52. The British Rubber Producers' Research Association, 48 Tewin Rd., Welwyn Garden City, Herts, England. 8 and 32 pages, respectively. **"Why Cellulose Plastics?"; "Ethyl Cellulose—** Properties and Uses"; **"Ethyl Cellulose** Formulations with Resins and Plasticizers." Hercules Powder Co., Wilmington, Del. 4, 48, and 26 pages respectively. **"Plasticizer TR-11."** Technical Service Bulletin No. 25. Thiokol Corp., Trenton, N. J. 4 pages. **"Chemicals by Glyco."** Glyco Products Co.,

Inc., 26 Court St., Brooklyn 2, N. Y. 136 pages. **"We Call It Public Relations."** Shell Oil Co., Inc., 50 W. 50th St., New York 20, N. Y. 62 pages.

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# Market Reviews

## COTTON & FABRICS

NEW YORK COTTON EXCHANGE WEEK-END CLOSING PRICES

| | Oct. 28 | Nov. 25 | Dec. 2 | Dec. 9 | Dec. 16 | Dec. 23 |
|---|---|---|---|---|---|---|
| Futures | | | | | | |
| Jan. | 21.59 | 21.69 | 21.62 | 21.72 | 21.75 | 21.75 |
| Mar. | 21.76 | 21.68 | 21.74 | 21.84 | 21.90 | 21.94 |
| July | 21.58 | 21.52 | 21.53 | 21.51 | 21.46 | 21.49 |
| Oct. | 20.74 | 20.80 | 20.77 | 20.70 | 20.53 | 20.58 |
| Dec. | 20.54 | 20.70 | 20.69 | 20.58 | 20.40 | 20.45 |

TRADING was restricted in the cotton futures market in December because of uncertainties over a possibility that the government cotton policy may be modified. The 15/16-inch spot middling price of 22.16c per pound on December 4 rose to 22.31c on December 12, dropped to 22.29c December 18, and closed at 22.52c on January 6. The market was generally dull, but steady.

Participants in the Cotton Conference called by Stephen Pace, Congressional representative from Georgia, reached only a limited agreement. Industry groups differed about plans for postwar cotton pricing. A popular suggestion is to permit a world price for cotton and pay the farmer a bonus equal to the difference between the world price and parity. The United States is expected to have a postwar surplus of 12,000,000 bales of cotton, which adds complications to the price factor in the trade's problems.

The crop reporting board of the Department of Agriculture placed the final official cotton crop estimate for the current season at 12,359,000 bales. Production last year totaled 11,427,000 bales. Both Brazil and the U.S.S.R. reported record cotton crops for the year.

### Fabrics

Heavy and prolonged fighting in Europe and accelerated action in the Pacific area have placed large new military procurement demands on all divisions of the textile market. Military needs are immediate and critical and will cut sharply into the amount of cloth available for civilian use. To spur output all constructions of duck fabrics in the gray sold under contract to the War or Navy departments were exempted from price control from December 14, 1944, to March 13, 1945. Virtually the entire duck production is earmarked for military procurement. The army set minimum requirements of 65,000,000 yards as its monthly needs. It will release skilled weavers from forces in this country to step up production.

Practically no sheetings are obtainable except on the very highest ratings. Rain coat materials are extremely difficult to obtain. Manufacturers of raincoats can sell almost any type for which they can obtain cloth. No improvements in the supply of sheetings or raincoatings are expected in the first quarter of 1945.

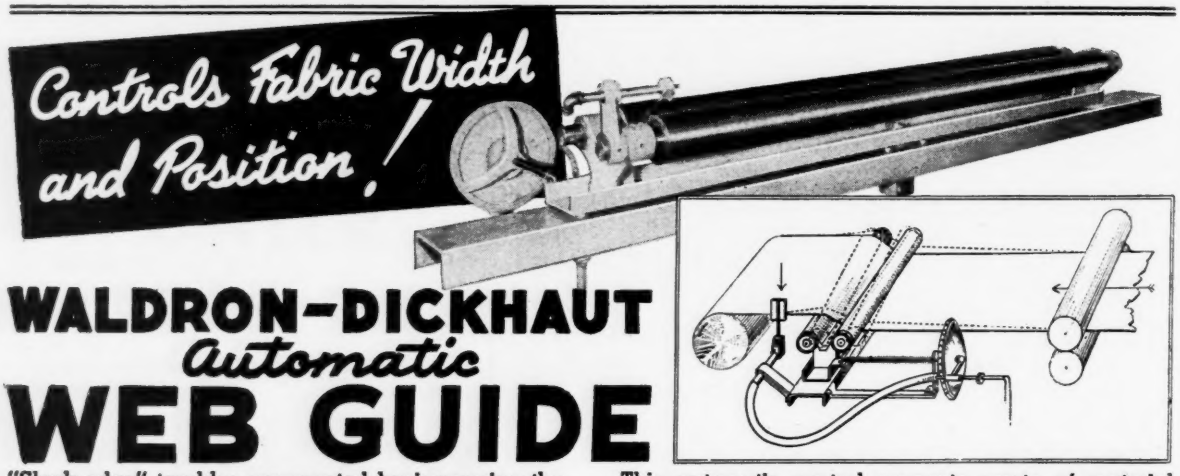
The WPB tire cord program, it is believed, will result in a severe cut in yarns for civilian use. Military requirements were described as "colossal." A diversion of 10% or more of yarns from the tire program to duck production is seen as a possibility to alleviate the even more critical need of army tents.

Direction 9 to General Conservation Order M-317 prohibits from January 15 to March 31, 1945, sales and deliveries of certain carded cotton weaving yarns, except on direct contract from the Army, Navy, Maritime Commission, or WSA, on subcontracts from these agencies, or on a rating assigned by WPB Textile Bureau on application on Form WPB-2842.

Less synthetic elastic yarns are available to manufacturers than conditions three months ago had let them to expect. Production of elastic yarn is slowly increasing, but shortages of rayon and cotton fabrics continue to restrict further the output of garments utilizing these yarns.

## RECLAIMED RUBBER

THE rate of activity in reclaimed rubber in December held to the substantial levels reported for the preceding month. The demand was general for all types except for wire insulation. An increased demand for this type is anticipated at an early date together with a larger interest in many other lines. Supplies are termed adequate. Tube reclaims are in a better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# DUCK

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**ON THE HOME FRONT** production of our famous Superior Army, Oceanic, Cypress, Sherman, Monarch, Buckeye and Magnolia duck continues to be channeled to the armed services and to those essential industries able to comply with current government directives. Wellington Sears Company, 65 Worth Street, New York 13, N. Y.

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position than previously, but not in so good supply as they might be. A big year for the reclaim industry has been predicted for 1945.

### Reclaimed Rubber Prices

**Auto Tire**

| | Sp. Grav. | c per Lb. |
|---|---|---|
| Black Select | 1.16-1.18 | 6¾/ 7 |
| Acid | 1.18-1.22 | 7¾/ 8 |
| **Shoe** | | |
| Standard | 1.56-1.60 | 7¼/ 7½ |
| **Tubes** | | |
| Black | 1.14-1.26 | 11½/11¾ |
| Gray | 1.15-1.26 | 12¾/13½ |
| Red | 1.15-1.32 | 12¼/12¾ |
| **Miscellaneous** | | |
| Mechanical blends | 1.25-1.50 | 4¾/ 5¾ |
| White | 1.35-1.50 | 13¾/14¾ |

The above list includes those items or classes only that determine the price bases of all derivative reclaim grades. Every manufacturer produces a variety of special reclaims in each general group separately featuring characteristic properties of quality, workability, and gravity at special prices.

## SCRAP RUBBER

SCRAP rubber received at reclaiming plants in December was less than the tonnage consumed. This usual seasonal trend may prevail through the winter. The accentuated demand last month was for red tubes. A demand for reclaim with a high carbon-black content may materialize, and with it a stronger call for black tube scrap. During the past year 90% of the consumable scrap rubber stockpiled by the Rubber Reserve Co. was disposed of. In 1945 reclaimers will have to seek the bulk of their needs from dealers. The supply will be dependent upon daily collections because scrap dealers do not have stock-piles. This replacement problem is not so severe as it might be in a normal year because scrap inventories at reclaiming plants are far above normal. These accumulations were obtained at normal or below normal prices. Since no overpriced inventories exist, the inventory position of reclaiming plants is not regarded as dangerous so far as price structure goes. A large part of 1945 scrap collection, it is believed, will consist of by-products from splitters. In December certain tire parts were sold at about 10% under ceiling prices. Other types of scrap rubber commanded the ceiling price.

### Scrap Rubber Ceilings

| | c per Lb. |
|---|---|
| **Inner Tubes†** | |
| Red passenger tubes | 7½ |
| Black passenger tubes | 6¾ |
| Truck tubes | 6½ |
| **Tires‡** | **$ per Short Ton** |
| Mixed passenger tires | 20.00 |
| Beadless passenger tires | 26.00 |
| Mixed truck tires | 20.00 |
| Solid tires | 36.00 |
| **Peelings†** | |
| No. 1 peelings | 52.25 |
| No. 2 peelings | 33.00 |
| No. 1 light colored (zinc) carcass | 57.75 |
| **Miscellaneous Items*** | |
| Air brake hose | 25.00 |
| Miscellaneous hose | 17.00 |
| Rubber boots and shoes | 33.00 |
| Black mechanical scrap above 115 sp. gr. | 20.00 |
| General household and industrial scrap | 15.00 |

† All consuming centers except Los Angeles.
‡ Akron only.
* All consuming centers.

### Fixed Government Prices*

| | Price per Pound: Civilian Use | Price per Pound: Other Than Civilian Use |
|---|---|---|
| **Balata** | | |
| Manaos Block | $0.38¾ | $0.38¾ |
| Swinam Sheet | .42½ | .42½ |
| **Guayule** | | |
| Guayule (*carload lots*) | .17½ | .31 |
| **Latex** | | |
| Normal (*tank car lots*) | .26 | .43½ |
| Creamed (*tank car lots*) | .26¾ | .44¼ |
| Centrifuged (*tank car lots*) | .27¾ | .45¼ |
| Heat-Concentrated (*carload drums*) | .29½ | .47 |
| **Plantation Grades** | | |
| No. 1X Ribbed Smoked Sheets | .22½ | .40 |
| 1X Thin Pale Latex Crepe | .22½ | .40 |
| 2 Thick Pale Latex Crepe | .22 | .39½ |
| 1X Brown Crepe | .21⅜ | .38⅞ |
| 2X Brown Crepe | .21⅛ | .38⅝ |
| 2 Remilled Blankets (Amber) | .21¼ | .38¾ |
| 3 Remilled Blankets (Amber) | .21⅛ | .38⅝ |
| Rolled Brown | .18 | .35½ |
| **Synthetic Rubber** | | |
| GR-M (Neoprene GN) | .27½ | .45 |
| GR-S (Buna S) | .18½ | .36 |
| GR-I (Butyl) | .15½ | .33 |
| **Wild Rubber** | | |
| Upriver Coarse (crude) | .12⅝ | .26⅛ |
| (washed and dried) | .20¼ | .37¾ |
| Islands Fine (crude) | .14⅝ | .28¼ |
| (washed and dried) | .22½ | .40 |
| Caucho Ball (crude) | 11⅝ | .29¾ |
| (washed and dried) | .19½ | .37 |
| Mangabiera (crude) | .08½ | .19¾ |
| (washed and dried) | .18 | .35⅝ |

* For a complete list of all grades of all rubbers, including crude, balata, guayule, synthetic, and latex, see Rubber Reserve Co. Circular 17, p. 169, May, 1943, issue.


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**ADDRESS BOX NO. 910, Care of INDIA RUBBER WORLD.**

**TIRE CURING FOREMAN—Good opportunity for experienced foreman capable of supervising production in pot heaters and individual vulcanizers. Offers attractive postwar as well as present-day opportunity. Eastern concern. Address Box No. 4, care of INDIA RUBBER WORLD.**

**TIRE FINISHING SUPERVISOR—Must have experience in supervising all duties connected with cured tire final finishing. Excellent opportunity for advancement with postwar security. Located in Pennsylvania. Address Box No. 5, care of INDIA RUBBER WORLD.**

**TUBE ROOM SUPERINTENDENT—Must have thorough knowledge of all phases of inner tube manufacture. Opening offers excellent opportunity to man with initiative and ability. Plant located in Pennsylvania. State all qualifications first letter. Address Box No. 6, care of INDIA RUBBER WORLD.**

TEXTILE COATINGS CHEMIST BY LARGE EASTERN MANUfacturer of lacquer, vinyl, alkyd, and other synthetic resin coatings. Excellent opportunity for man with textile coatings experience. Salary commensurate with ability. Give full qualifications and detailed information in first letter. Will be held in strict confidence. Address Box No. 7, care of INDIA RUBBER WORLD.

TEXTILE COATINGS SALESMEN FOR NEW ENGLAND AND New York areas served by large manufacturer of vinyl, alkyd, lacquer, and other synthetic resin and rubber coatings. Excellent opportunity for technical man with textile or coatings experience. Give full qualifications and detailed information in first letter. Will be held in strict confidence. Address Box No. 8, care of INDIA RUBBER WORLD.

WANTED: RUBBER COMPOUNDER AND ENGINEER WITH 3 to 7 years of experience, preferably on hose or belts, by rubber manufacturer located in Eastern Pennsylvania. Please give full details as to experience, qualifications, salary desired, etc., in first letter. Statement of Availability is necessary. Address Box No. 9, care of INDIA RUBBER WORLD.

**WANTED BY PROGRESSIVE WEST COAST FIRM general foremen experienced all phases of molded rubber goods. Address Box No. 10, care of INDIA RUBBER WORLD.**

**CHEMIST FOR ROUTINE AND DEVELOPMENT work. Experienced in rubber and synthetics. By old successful Chicago factory; good opportunity for advancement. Salary commensurate with ability. Address Box No. 11, care of INDIA RUBBER WORLD.**

RUBBER CHEMIST, PERMANENT; MILL ROOM AND COMpounding experience, particularly synthetics; excellent prospects for advancement. Write for interview giving pertinent details. Address Box No. 13, care of INDIA RUBBER WORLD.

## SITUATIONS OPEN (Continued)

**PACKING ENGINEER**

**Experienced Packing Engineer who has knowledge of the proper application and use and can sell rubber, duck, fibrous, and asbestos Packings. This is a permanent job with large manufacturer having national distribution. Now on essential war products with no conversion problems to peacetime basis. A high-grade man capable of high bracket earnings is required. Salary and expenses. Do not answer unless you are an experienced Packing man and can qualify by being able to recommend and sell Packings to Industry, either direct or through Distributors. State your qualifications fully to secure interview. Address Box No. 12, care of INDIA RUBBER WORLD.**

CHEMIST, FAMILIAR WITH SHOE MANUFACTURE, PARTICUlarly cements and machines, to take charge of development of shoe adhesives, including customer contact, adhesive research, production methods, and control systems. One capable of carrying responsibility in a firm well established and known in the shoe adhesive industry. Location near Boston. Address Box No. 14, care of INDIA RUBBER WORLD.

RUBBER CHEMIST. COLLEGE GRADUATE IN CHEMISTRY or Chemical Engineering with compounding experience desired for laboratory research and development work on compounding and evaluation of synthetic rubbers by large oil company located in New York area. In reply give age, education, experience, and salary expected. Our own employes have been informed of the appearance of this advertisement. Address Box No. 17, care of INDIA RUBBER WORLD.

CHEMIST: EXPERIENCED IN ALL PHASES OF COMPOUNDing molded rubber goods and sponge rubber products, using both natural and synthetic rubber. Excellent opportunity for advancement with small progressive company located in the Midwest. Address Box No. 18, care of INDIA RUBBER WORLD.

CHEMIST—EXCELLENT POSITION FOR MAN WITH INDUStrial experience in plasticizers and general rubber compounding. Large eastern oil company. State training, salary desired, and submit photograph. Address Box No. 20, care of INDIA RUBBER WORLD.

CHEMIST OR CHEMICAL ENGINEER—NATURAL RUBBER, synthetic rubber, or colloid experience. Company has excellent postwar future. Wonderful opportunity for the right man. Location, Metropolitan New York Area. Send complete résumé to Box 22, care of INDIA RUBBER WORLD.

## SITUATIONS WANTED

SYNTHETIC RUBBER AND PLASTICS CHEMIST, B.S. AND M.S. 6 years' industrial experience in compounding synthetics. At present in charge of research and development of synthetics for coated fabrics, adhesives, moldings, sheet goods, and extrusion. Married; 4-F; salary $5,800. Address Box No. 15, care of INDIA RUBBER WORLD.

RUBBER CHEMIST AND COMPOUNDER, EXPERIENCED IN factory supervising and processing. Recently returned after several years in Latin America. Would welcome opportunity to assist in essential war work. Thirty-five years' experience in tires and tubes, drug sundries, footwear, heels, soles, miscellaneous press goods, tubing machine products, mechanical goods, rclaimed rubber, etc. Location immaterial. Address Box No. 16, care of INDIA RUBBER WORLD.

SUPERINTENDENT, TECHNICAL, WITH LONG EXPERIENCE in handling natural and synthetic rubber, mechanical goods, now available. Development engineer and compounder. Can estimate costs and provide specifications. Address Box No. 26, care of INDIA RUBBER WORLD.

ENGINEER WITH BROAD EXPERIENCE IN DEVELOPMENT work and compounding of natural, synthetic, and reclaimed rubber, now available. Can estimate costs and compile specifications for large or small plants. Address Box No. 27, care of INDIA RUBBER WORLD.

BROCKTON TOOL COMPANY
Central Street
QUALITY MOULDS FOR ALL PURPOSES
South Easton, Mass.
THE FIRST STEP — A QUALITY MOULD

(*Classified Advertisements Continued on Page 493*)

# COMPOUNDING INGREDIENTS

## Current Quotations*

### Abrasives

| | | |
|---|---|---|
| Fumicestone, powdered | lb. | $0.035 /$0.04 |
| Rottenstone, domestic | lb. | .025 / .03 |

### Accelerators, Inorganic

| | | |
|---|---|---|
| Lime, hydrated, *l.c.l.*, New York | ton | 25.00 |
| Litharge (commercial) | lb. | .085 / .09 |
| Eagle, sublimed | lb. | .085 / .09 |
| Magnesia, calcined, extra light technical | lb. | .25 |
| Heavy technical | lb. | .05 / .1275 |
| Extra light U. S. P. | lb. | .26 |
| Medium light technical | lb. | .12 |
| Magnesia, light technical | lb. | .25 |

### Accelerators, Organic

| | | |
|---|---|---|
| A-10 | lb. | .36 / .42 |
| A-19 | lb. | .52 / .58 |
| A-32 | lb. | .60 / .70 |
| A-77 | lb. | .42 / .55 |
| A-100 | lb. | .42 / .55 |
| Accelerator No. 8 | lb. | .63 / .65 |
| 49 | lb. | .40 / .42 |
| 552 | lb. | 1.63 |
| 808 | lb. | .59 / .61 |
| 833 | lb. | 1.13 / 1.15 |
| Acrin | lb. | .65 |
| Advan | lb. | .55 |
| Altax | lb. | .39 / .41 |
| Arazate | lb. | 1.53 |
| B-J-F | lb. | .34 / .39 |
| Beutene | lb. | .59 / .64 |
| Butasan | lb. | 1.10 |
| Butazate | lb. | 1.13 |
| Butyl Eight | lb. | .97 / .99 |
| C-P-B | lb. | 1.95 |
| Captax | lb. | .34 / .36 |
| Cumate | lb. | 1.60 |
| Cuprax | lb. | .60 |
| D-B-A | lb. | 1.95 |
| Delac P. | lb. | .39 / .48 |
| Di-Esterex-N | lb. | .50 / .57 |
| DOTG (Diorthotolyguanidine) | lb. | .44 / .46 |
| DPG (Diphenylguanidine) | lb. | .35 / .41 |
| El-Sixty | lb. | .36 / .43 |
| Ethasan | lb. | 1.10 |
| Ethazate | lb. | 1.10 |
| Ethylidene Aniline | lb. | .42 / .43 |
| Ethyl Tuads | lb. | 1.25 |
| Ethyl Unads | lb. | 1.25 |
| Formaniline | lb. | .36 / .37 |
| Guantal | lb. | .39 / .48 |
| Hepteen | lb. | .34 / .39 |
| Base | lb. | 1.25 / 1.40 |
| Lead Oleate Witco | lb. | 1.75 |
| Ledate | lb. | 1.20 |
| MBT | lb. | .34 / .36 |
| MBTS | lb. | .39 / .41 |
| Methasan | lb. | 1.20 |
| Methazate | lb. | 1.20 |
| Methyl Tuads | lb. | 1.25 |
| Monex | lb. | 1.53 |
| Morfex "33" | lb. | .60 / .65 |
| Novac | lb. | 1.40 |
| O-X-A-F | lb. | .38 / .43 |
| Pentex | lb. | .74 / .84 |
| Flour | lb. | .1225/ .1325 |
| Phenex | lb. | .49 / .54 |
| Pipazate | lb. | 1.53 |
| Pip-Pip | lb. | 1.63 |
| Polyac | lb. | 1.25 |
| R & H 50-D | lb. | .42 / .43 |
| R-2 Crystals | lb. | 1.55 |
| Rotax | lb. | .44 / .46 |
| Safex | lb. | 1.15 / 1.25 |
| Santocure | lb. | .60 / .67 |
| Selenac | lb. | 1.60 |
| SPDX-G | lb. | .53 / .58 |
| SRA No. 2 | lb. | .53 / .55 |
| Super-Sulphur No. 2 | lb. | .13 / .15 |
| Tetrone | lb. | 1.25 |
| A | lb. | 1.85 |
| Thiofide | lb. | .39 / .46 |
| Thionex | lb. | 1.25 |
| Thiotax | lb. | .34 / .41 |
| Thiurad | lb. | 1.25 |
| Thiuram E | lb. | 1.25 |
| M | lb. | 1.25 |
| Trimene | lb. | .54 / .64 |
| Base | lb. | 1.03 / 1.18 |
| Triphenylguanidine (TPG) | lb. | .45 |
| Tuex | lb. | 1.25 |
| 2-MT | lb. | .58 / .60 |
| Ulto | lb. | .99 / 1.04 |
| Ureka | lb. | $0.50 /$0.57 |
| Blend B | lb. | .50 / .57 |
| C | lb. | .48 / .55 |
| Vulcanex | lb. | .42 / .43 |
| Z-B-X | lb. | 2.45 |
| Zenite | lb. | .37 / .39 |
| A | lb. | .42 / .44 |
| B | lb. | .39 / .41 |
| Zimate, Butyl | lb. | 1.10 |
| Ethyl | lb. | 1.10 |
| Methyl | lb. | 1.20 |

### Activators

| | | |
|---|---|---|
| Activex | lb. | .20 / .22 |
| Aero Ac 50 | lb. | .46 / .52 |
| Barak | lb. | .50 |
| MODX | lb. | .295 / .345 |
| SL-20 | lb. | .1089/ .1135 |

### Age Resisters

| | | |
|---|---|---|
| AgeRite Alba | lb. | 1.95 / 2.05 |
| Gel | lb. | .52 / .54 |
| Hipar | lb. | .61 / .63 |
| Powder | lb. | .40 / .42 |
| Resin | lb. | .43 / .45 |
| D | lb. | .40 / .42 |
| White | lb. | 1.23 / 1.33 |
| Akroflex C | lb. | .53 / .55 |
| Albasan | lb. | .69 / .74 |
| Aminox | lb. | .40 / .49 |
| Antox | lb. | .54 / .56 |
| Betanox | lb. | .43 / .52 |
| B-L-E | lb. | .40 / .49 |
| Powder | lb. | .61 / .70 |
| B-X-A | lb. | .43 / .52 |
| Copper Inhibitor X-872-A | lb. | 1.15 |
| Flectol H | lb. | .40 / .47 |
| Neozone (standard) | lb. | .61 / .63 |
| A | lb. | .40 / .42 |
| C | lb. | .43 / .45 |
| D | lb. | .40 / .42 |
| Distilled | lb. | .45 / .47 |
| E | lb. | .61 / .63 |
| Oxynone | lb. | .77 / .90 |
| Permalux | lb. | 1.19 / 1.20 |
| Santoflex B | lb. | .40 / .47 |
| BX | lb. | .54 / .61 |
| Santovar-O | lb. | 1.15 / 1.40 |
| Solux | lb. | 1.28 / 1.30 |
| Stabilite | lb. | .48 / .50 |
| Alba | lb. | .69 / .74 |
| Thermoflex | lb. | 1.18 / 1.20 |
| A | lb. | .61 / .63 |
| C | lb. | .54 / .56 |
| Tysonite | lb. | .165 / .17 |
| V-G-B | lb. | .43 / .52 |

### Alkalies

| | | |
|---|---|---|
| Caustic soda, flake, Columbia (400-*lb. drums*) | 100 *lbs.* | 2.50 |
| Liquid, 50% | 100 *lbs.* | 1.75 |
| Solid (100-*lb. drums*) | 100 *lbs.* | 2.10 |

### Antiscorch Materials

| | | |
|---|---|---|
| Cumar RH | lb. | .105 |
| E-S-E-N | lb. | .34 / .39 |
| R-17 Resin (*drums*) | lb. | .1075 |
| RM | lb. | 1.25 |
| Retarder W | lb. | .36 |
| Retardex | lb. | .445 / .475 |
| U-T-B | lb. | .34 / .39 |

### Antiseptics

| | | |
|---|---|---|
| Compound G-4 | lb. | .95 / 1.40 |
| G-11 | lb. | 4.50 / 4.75 |

### Antisun Materials

| | | |
|---|---|---|
| Heliozone | lb. | .23 / .24 |
| S.C.R. | lb. | .32 / .34 |
| Sunproof | lb. | .2275/ .2775 |

### Blowing Agents

| | | |
|---|---|---|
| Unicel | lb. | .50 |

### Brake Lining Saturant

| | | |
|---|---|---|
| B.R.T. No. 3 | lb. | .0175/ .0185 |

### Carbon Black

**Conductive Channel—CC**

| | | |
|---|---|---|
| Conductex A | lb. | .05 / .085 |
| Huber 35-C | lb. | .075 |
| Spheron C | lb. | .0455 |
| I | lb. | .0405 |
| N | lb. | .15 |
| Witco R20 | lb. | .0455 |
| R40 | lb. | .105 / .14 |
| Voltex | lb. | .105 / .14 |

**Hard Processing Channel—HPC**

| | | |
|---|---|---|
| Continental F | lb. | .0355† |
| Huber HX | lb. | .0355† |
| Kosmobile S/Dixiedensed S | lb. | .0355† |
| Micronex Mark II | lb. | .0355/ .075 |
| Spheron #4 | lb. | .0355† |
| Witco 6 | lb. | .0355† |

**Medium Processing Channel—MPC**

| | | |
|---|---|---|
| Arrow | lb. | .0355† |
| Continental A | lb. | .0355† |
| Huber TX | lb. | .0355† |
| Kosmobile 66/Dixiedensed 66 | lb. | .0355† |
| Spheron #6 | lb. | $0.0355† |
| Standard Micronex | lb. | .0355/$0.075 |
| Witco 1 | lb. | .0355† |

**Easy Processing Channel—EPC**

| | | |
|---|---|---|
| Continental AA | lb. | .0355† |
| Kosmobile 77/Dixiedensed 77 | lb. | .0355† |
| Micronex W-6 | lb. | .0355† |
| Spheron #9 | lb. | .0355† |
| Witco 12 | lb. | .0355† |
| Wyex | lb. | .0355† |

**Conductive Furnace—CF**

| | | |
|---|---|---|
| Statex A | lb. | .08 / .10 |
| Sterling I | lb. | .09 |

**Fine Furnace—FF**

| | | |
|---|---|---|
| Statex B | lb. | .07 / .09 |

**High Modulus Furnace—HMF**

| | | |
|---|---|---|
| Kosmos 40/Dixie 40 | lb. | .05 / .075 |
| Modulex | lb. | .05 |
| Philblack A | lb. | .05 / .06 |
| Statex 93 | lb. | .05 / .075 |
| Sterling L | lb. | .05 |

**Semi-Reenforcing Furnace—SRF**

| | | |
|---|---|---|
| Continex | lb. | .035 / .055 |
| Furnex | lb. | .035 / .06 |
| Gastex | lb. | .035 / .06 |
| Kosmos 20/Dixie 20 | lb. | .035† |
| Sterling | lb. | .035† |
| Witco | lb. | .035 / .055 |

**Fine Thermal—FT**

| | | |
|---|---|---|
| P-33 | lb. | .04 |

**Medium Thermal—MT**

| | | |
|---|---|---|
| Thermax | lb. | .0225 |
| Velvetex | lb. | |

### Colors

**Black**

| | | |
|---|---|---|
| Lampblack (commercial), *l.c.l.* | lb. | .12 / .14 |

**Blue**

| | | |
|---|---|---|
| Du Pont Powders | lb. | 2.25 / 3.75 |
| Toners | lb. | .30 / 3.50 |

**Brown**

| | | |
|---|---|---|
| Mapico | lb. | .1135 |

**Green**

| | | |
|---|---|---|
| Chrome | lb. | .25 |
| Oxide (*freight allowed*) | lb. | .25 |
| Chromium Hydroxide | lb. | .70 |
| Guignet's (*bbls.*) | lb. | .70 |
| Toners | lb. | .35 / 4.00 |

**Orange**

| | | |
|---|---|---|
| Du Pont Powders | lb. | 2.75 / 3.05 |
| Toners | lb. | .30 / 1.50 |

**Red**

| | | |
|---|---|---|
| Antimony Crimson, 15/17% | lb. | .48 |
| R.M.P. No. 3 | lb. | .48 |
| Sulphur free | lb. | .52 |
| 7-A | lb. | .37 |
| Z-2 | lb. | .25 |
| Du Pont Powders | lb. | .48 / 1.65 |
| Iron Oxide, *l.c.l.* | lb. | .07 / .15 |
| Mapico | lb. | .0885/ .096 |
| Rub Er-Red (*bbls.*) | lb. | .0975 |
| Toners | lb. | .25 / 4.15 |

**White**

| | | |
|---|---|---|
| Lithopone (*bags*) | lb. | .0425/ .045 |
| Albalith | lb. | .0425/ .045 |
| Eagle | lb. | .0725/ .0750 |
| Titanium Pigments | | |
| Rayox | lb. | .145 / .155 |
| Titanox-A LO and MO | lb. | .145 / .15 |
| C | lb. | .055 / .0575 |
| Ti-Tone | lb. | |
| Zopaque (50-*lb. bags*) | lb. | .145 |
| Zinc Oxide | | |
| Azo ZZZ-11 | lb. | .0725/ .075 |
| 44 | lb. | .0725/ .075 |
| 55 | lb. | .0725/ .075 |
| 66 | lb. | .905 / .0975 |
| Eagle, lead free | lb. | .0725/ .0750 |
| French Process, Florence | | |
| Green Seal-8 | lb. | .09 / .0925 |
| Red Seal-9 | lb. | .085 / .0875 |
| White Seal-7 | lb. | .095 / .0975 |
| Kadox, Black Label-15 | lb. | .0725/ .075 |
| No. 25 | lb. | .085 / .0875 |
| 72 | lb. | .0725/ .075 |
| Red Label-17 | lb. | .0725/ .075 |
| Horse Head XX Special 3 | lb. | .0725/ .075 |
| XX Red-4 | lb. | .0725/ .075 |
| 78 | lb. | .0725/ .075 |
| 156 | lb. | .0725/ .075 |
| 166 | lb. | .0725/ .075 |
| St. Joe (lead free) | | |
| Black Label | lb. | .0725/ .075 |
| Green Label | lb. | .0725/ .075 |
| Red Label | lb. | .0725/ .075 |
| U.S.P. No. 12 | lb. | .105 / .1075 |
| Zinc Sulphide Pigments | | |
| Cryptone ZS No. 800 | lb. | .0825 .085 |

**Yellow**

| | | |
|---|---|---|
| Du Pont Powders | lb. | .70 / 1.75 |
| Mapico | lb. | .0685/ .071 |
| Toners | lb. | .50 / 1.37 |

### Dispersing Agents

| | | |
|---|---|---|
| Bardex | lb. | .0425/ .045 |

*Prices in general are f.o.b. works. Range indicates grade or quantity variations. Space limitation prevents listing of all known ingredients. Prices are not guaranteed, and those readers interested should contact suppliers for spot prices.

†Price quoted is f.o.b. works (bags). The price f.o.b. works (bulk) is $0.033 per pound. All prices are carlot.

# Classified Advertisements

Continued

## SITUATIONS WANTED (Continued)

CHEMIST, 20 YEARS' EXPERIENCE IN RUBBER AND ALLIED fields, some knowledge of plastics. Desires responsible position in laboratory, factory or sales with postwar prospects. North New Jersey or Metropolitan Area preferred. Address Box No. 19, care of INDIA RUBBER WORLD.

CALENDER FOREMAN, NOW EMPLOYED, DESIRES a change. 15 years' experience in mixing, mill, and calender departments in footwear and tire production. Address Box No. 25, care of INDIA RUBBER WORLD.

## BUSINESS OPPORTUNITIES

FOR SALE: WELL-EQUIPPED SMALL RUBBER plant now operating on soles and heels. Address Box No. 21, care of INDIA RUBBER WORLD.

WANTED TO PURCHASE: SMALL RUBBER plant well equipped making molded, extruded, and coated products. Give full details. Cash available. Address Box No. 29, care of INDIA RUBBER WORLD.

WANT TO INVEST $25,000 OR MORE IN GOING rubber company or will purchase same at reasonable figure. Address Box No. 30, care of INDIA RUBBER WORLD.


**GROUND BARYTES**
PROMPT SHIPMENT
CLINCHFIELD SAND & FELDSPAR CORP.
618 Mercantile Trust Bldg.
Baltimore 2, Md.

AIR BAG BUFFING MACHINERY
STOCK SHELLS HOSE POLES
MANDRELS
NATIONAL SHERARDIZING & MACHINE CO.
868 WINDSOR ST. HARTFORD, CONN.
*Representatives*
Akron San Francisco New York

**GRANULATED CORK**
*FOR EXTENDING RUBBER*
SOUTHLAND CORK COMPANY
P. O. BOX 868 NORFOLK, VA.

***ENERPRENE***
*A Non-Rubber Cement for Bonding Synthetic Rubber to Metal, etc.*
THE ENERPRENE COMPANY
1910 First Central Tower Akron, Ohio

SMALL RUBBER PARTS for WAR CONTRACTS
BLOWN • SOLID • SPONGE
FROM NATURAL, RECLAIMED, AND SYNTHETIC RUBBER
THE BARR RUBBER PRODUCTS CO. SANDUSKY OHIO

Carey EST. 1873
**MAGNESIA**
OXIDES AND CARBONATES—LIGHT AND HEAVY
FOR TECHNICAL AND DRUG USES
THE PHILIP CAREY MFG. COMPANY
Cincinnati, Ohio
*Branches in all principal cities*
WM. S. GRAY & CO., *Distributors*, New York City

**COLORS for RUBBER**
Red Iron Oxides
Green Chromium Oxides
Green Chromium Hydroxides
*Reinforcing Fillers and Inerts*
C. K. WILLIAMS & CO.
EASTON, PA.

CONTINENTAL-MEXICAN RUBBER CO., Inc.
745 Fifth Ave., New York City
Producer in Mexico of
**GUAYULE RUBBER**
Washed — AMPAR BRAND — Dried
Formerly Distributed By
CONTINENTAL RUBBER CO. OF NEW YORK
An Affiliated Company

**STEARATES**
SPECIAL QUALITIES FOR THE RUBBER TRADE
• ZINC
• ALUMINUM
• MAGNESIUM
• CALCIUM
WHITTAKER, CLARK & DANIELS, Inc.
260 WEST BROADWAY • NEW YORK CITY


*(Classified Advertisements Continued on Page 495)*

| | | |
|---|---|---|
| Bardol | lb. | $0.02 /$0.0275 |
| B | lb. | .05 / .0525 |
| Nevoil (*drums, c.l.*) | lb. | .02 / .025 |

**Extenders**

| | | |
|---|---|---|
| Advagum 1098 | lb. | .42 |
| 1198 | lb. | .40 |
| Dielex | lb. | .055 / .06 |
| Alba | lb. | .45 |
| Extender 15 | lb. | .32 |
| Extendex C | lb. | .15 |
| Gilsonite Selects | ton | 30.50 |
| Naftolen R-100 | lb. | .10 / .12 |
| Oroplast H | lb. | .1125/ .1175 |
| L | lb. | .0725/ .0825 |
| M | lb. | .0825/ .0925 |

**Fillers, Inert**

| | | |
|---|---|---|
| Asbestos Fiber | ton | 15.50 /48.00 |
| Barytes | ton | 25.55 /40.00 |
| Off color, domestic | ton | 29.00 |
| White, domestic | ton | 38.50 /40.00 |
| Blanc fixe, dry, precip. | ton | 80.00 |
| Calcene T | ton | 37.50 /45.00 |
| Kalite No. 1 | ton | 26.00 |
| Kalvan | ton | 100.00 |
| Magnesium carbonate *l.c.l.* | lb. | .0625/ .075 |
| Pyrax A | ton | 7.90 |
| Whiting | | |
| Suprex White (precipitated calcium carbonate) | ton | 32.50 |
| Witco, *c.l.* | ton | 16.50 |
| Witcarb | ton | 32.50 |
| R | ton | 50.00 |

**Finishes**

| | | |
|---|---|---|
| Mica, *l.c.l.* | lb. | .045 / .055 |
| Rubber lacquer, clear | gal. | 1.00 / 2.00 |
| Colored | gal. | 2.00 / 3.50 |
| Shoe Varnish | gal. | 1.45 |
| Talc | ton | 25.00 /35.00 |

**Flock**

| | | |
|---|---|---|
| Cotton flock, dark | lb. | .095 / .112 |
| Dyed | lb. | .45 / .85 |
| White | lb. | .12 / .20 |
| Fabrifil X-24-G | lb. | .095 |
| X-24-W | lb. | .135 |
| Filfloc 6000 | lb. | .16 |
| F-40-9000 | lb. | .105 |
| Rayon flock, colored | lb. | 1.00 / 1.50 |
| White | lb. | .75 / 1.25 |

**Latex Compounding Ingredients**

| | | |
|---|---|---|
| Accelerator 89 | lb. | 1.20 |
| Advawet | lb. | .46 |
| Aerosol (*drums*) | lb. | .35 |
| Antox, dispersed | lb. | .54 |
| Aquarex BBX Conc. | lb. | .70 |
| Areskap No. 50 | lb. | .18 / .24 |
| 100, dry | lb. | .39 / .51 |
| Aresket No. 240 | lb. | .16 / .22 |
| 300, dry | lb. | .42 / .50 |
| Aresklene No. 375 | lb. | .35 / .50 |
| 400, dry | lb. | .51 / .65 |
| Black No. 23, dispersed | lb. | .22 / .40 |
| Casein | lb. | .24 / .2475 |
| Collocarb (Dispersed Wyex) | lb. | .06 / .07 |
| Copper Inhibitor X-872 | lb. | 2.25 |
| Darvan No. 1 | lb. | .30 / .34 |
| 2 | lb. | .30 / .34 |
| Dispersex No. 15 | lb. | .11 / .12 |
| 20 | lb. | .08 / .10 |
| Factex Dispersion A | lb. | .185 |
| Micronex, Colloidal | lb. | .06 / .07 |
| Nevilloid C-55 | lb. | .12 |
| Resin V | lb. | .13 |
| Santomerse D | lb. | .41 / .65 |
| S | lb. | .11 / .25 |
| Sodium Stearate | lb. | .40 |
| Stablex A | lb. | .90 / 1.10 |
| B | lb. | .70 / .90 |
| C | lb. | .40 / .50 |
| Sulphur, dispersed No. 2 | lb. | .08 / .12 |
| Tepidone | lb. | .63 |
| Tysonite, dispersed | lb. | .32 / .35 |
| Zinc oxide, dispersed | lb. | .12 / .15 |

**Mineral Rubber**

| | | |
|---|---|---|
| Black Diamond, *l.c.l.* | ton | 25.00 /30.00 |
| B.R.C. No. 20 | lb. | .0105/ .0115 |
| Hydrocarbon, Hard | ton | 25.00 /27.00 |
| Lode | lb. | .04 / .045 |
| MilliMar | lb. | .055 |
| Parmr | ton | 21.00 /29.00 |
| Pioneer, *c.l.* | lb. | 25.00 /30.00 |
| Witco MR solid | ton | 25.00 |
| Granular | ton | 30.00 |

**Mold Lubricants**

| | | |
|---|---|---|
| Aluminum Stearate | lb. | .23 / .24 |
| Aquarex D | lb. | .60 |
| MDL Paste | lb. | .25 |
| Colite | gal. | .90 / 1.15 |
| Dipex | lb. | .1275/ .15 |
| Lubrex | lb. | .25 / .30 |
| Rubber-Glo, conc. regular | gal. | .94 / 1.15 |
| Type W | gal. | .99 / 1.20 |
| Sericite | ton | 65.00 |
| Soapstone, *l.c.l.* | ton | 15.00 /35.00 |
| Zinc stearate | lb. | .30 / .31 |

**Reclaiming Oils**

| | | |
|---|---|---|
| B.R.V. | lb. | .03 / .0375 |
| C-10 | gal. | .19 / .24 |
| D-4 | gal. | .17 / .22 |
| E-5 | gal. | $0.15 /$0.20 |
| No. 1621 | lb. | .016 / .0235 |
| S.R.O. | lb. | .015 / .0225 |
| X-60 (reclaiming) | gal. | .20 / .28 |
| X-443 | gal. | .20 / .27 |

**Reenforcers, Other Than Carbon Black**

| | | |
|---|---|---|
| Alumina, Hydrated | | |
| Alorco C-740 | lb. | .0375/ .065 |
| C-741 | lb. | .0375/ .065 |
| Buca | ton | 40.00 |
| Carbonex Flakes | lb. | .03 / .035 |
| S | lb. | .031 / .036 |
| Plastic | lb. | .031 / .0335 |
| Clays | | |
| Aerfloted Hi-White | ton | 10.00 |
| Paragon | ton | 10.00 |
| Suprex | ton | 11.00 /23.50 |
| Catalpo, *c.l.* | ton | 30.00 |
| Champion | ton | 11.00 /23.50 |
| China | ton | 25.00 |
| Dixie | ton | 11.00 |
| Hydratex R | ton | 20.00 |
| "L" | ton | 10.00 |
| Langford | ton | 9.50 /20.00 |
| Magnolia | ton | 10.00 |
| McNamee | ton | 10.00 |
| #33 | ton | 30.00 |
| Par | ton | 11.00 |
| Paraforce, *c.l.* | ton | 50.00 |
| Witco, *c.l.* | ton | 25.00 |
| Cumar EX | lb. | .0525 |
| MH | lb. | .065 / .1175 |
| V | lb. | .0975/ .1275 |
| 465 Resin | lb. | .035 |
| "G" Resin | lb. | .08 |
| Nevindene | lb. | .105 / .135 |
| Resinex | lb. | .0275/ .0325 |
| Silene "EF" | lb. | .055 / .06 |
| Silical | ton | 65.00 /85.00 |

**Reodorants**

| | | |
|---|---|---|
| Amora (ABCD) | lb. | |
| Coumarin | lb. | 2.75 / 3.25 |
| Curodex 19 | lb. | 4.75 |
| 188 | lb. | 5.75 |
| 198 | lb. | 6.75 |
| Para-Dors (ABCDE) | lb. | .25 / 4.00 |
| Rodo No. 0 | lb. | 4.00 / 4.50 |
| 10 | lb. | 5.00 / 5.50 |
| Vanillin | lb. | 2.25 / 2.95 |

**Rubber Substitutes**

| | | |
|---|---|---|
| Black | lb. | .09 / .15 |
| Brown | lb. | .105 / .1875 |
| White | lb. | .0975/ .165 |
| Factice | | |
| Amberex Type B | lb. | .20 |
| Brown | lb. | .095 / .19 |
| Neophax A | lb. | .165 |
| B | lb. | .165 |
| White | lb. | .10 / .20 |

**Softeners and Plasticizers**

| | | |
|---|---|---|
| Abalyn | lb. | .0722/ .0947 |
| Ambidex | lb. | .23 |
| "S" | lb. | .23 |
| B.R.T. No. 7 | lb. | .02 / .021 |
| Belro Resin | 100 lb. | 2.71 / 3.00 |
| Bondogen | lb. | .98 / 1.05 |
| Bunnatol (for synthetic rubber) | lb. | |
| G | lb. | .40 / .50 |
| S | lb. | .40 / .50 |
| Butac | lb. | .085 / .105 |
| Butyl Roleate | lb. | .16 / .195 |
| Capryl Alcohol | lb. | .16 / .195 |
| Circosol-2XH Elasticator for GR-S | gal. | |
| Dibenzyl Sebacate | lb. | .67 / .74 |
| Phthalate | lb. | .51 / .59 |
| Dibutyl Sebacate | lb. | .46 / .565 |
| Dicapryl Phthalate | lb. | .25 / .30 |
| Dipentene | gal. | .56 / .58 |
| Dipolymer Oil | gal. | .33 / .38 |
| Dispersing Oil No. 10 | lb. | .0375/ .04 |
| Duraplex C-50 LV, 100% | lb. | .25 / .295 |
| Galex | lb. | .065 / .20 |
| Hercolyn | lb. | .1122/ .1347 |
| JMH | lb. | .65 / .67 |
| Marbon S | lb. | .65 / .75 |
| S-1 | lb. | .65 / .75 |
| Myristilene | lb. | .20 / .30 |
| Nevinol | lb. | .13 |
| No. 1-D Heavy Oil | lb. | .04 |
| 16 Resin | lb. | .60 |
| Nuba resinous pitch (*drums*) | | |
| Grades No. 1 and No. 2 | lb. | .029 |
| 3-X | lb. | .0425 |
| Palmalene | lb. | .15 |
| Para Flux (reg.) | gal. | .17 / .18 |
| No. 2016 | gal. | .135 / .19 |
| Para Lube | lb. | .046 / .048 |
| Paradene No. 1 (*drums*) | lb. | .0525 |
| No. 2 | lb. | .0525 |
| Special (*drums*) | | |
| 20 to 35° C.M.P. | lb. | .0265 |
| 35 to 45° C.M.P. | lb. | .0625 |
| 45 to 75° C.M.P. | lb. | .0575 |
| Paraplex AL-111 | lb. | .21 / .25 |
| G-25, 100% | lb. | .75 |
| Phthalate | lb. | .51 / .59 |
| Paroils | lb. | .0975/ .18 |
| Picco-100 | lb. | .09 |
| Piccocizer "30" | lb. | $0.055 /$0.06 |
| Piccolastic A-5 | lb. | .24 / .245 |
| Piccolyte Resins | lb. | .15 / .185 |
| Piccoumaron Resins | lb. | .045 / .15 |
| Pictar | gal. | .18 / .23 |
| Oil | gal. | .45 |
| Plasticizer B | lb. | .35 / .45 |
| 35 | lb. | .205 / .24 |
| 36 | lb. | .305 / .34 |
| Plastoflex No. 10 | lb. | .20 |
| No. 20 | lb. | .25 |
| Plastogen | lb. | .0775/ .08 |
| Plastone | lb. | .27 / .30 |
| Poly-pale Resin | lb. | .06 / .07 |
| R-19 Resin (drums) | lb. | .1075 |
| 21 Resin (*drums*) | lb. | .1075 |
| Reogen | lb. | .115 / .12 |
| Resin R6-3 | lb. | .38 / .40 |
| Rio Resin | lb. | .36 / .38 |
| RPA No. 1E | lb. | .55 |
| 2 | lb. | .65 |
| 3 | lb. | .46 |
| 4 | lb. | .80 |
| 5 | lb. | .57 |
| Santicizer B-16 | lb. | .32 / .36 |
| E-15 | lb. | .34 / .38 |
| M-17 | lb. | .355 / .39 |
| Sebacic Acid | lb. | .48 / .55 |
| Solvenol | gal. | .56 / .58 |
| Staybelite | lb. | .06 / .065 |
| Syntac | lb. | .275 / .35 |
| Tarzac | lb. | .23 / .24 |
| TP-10 | gal. | .55 / .75 |
| 90-B | gal. | .55 / .65 |
| TR-11 | lb. | .035 |
| Tricresyl Phosphate | lb. | .24 / .245 |
| Turgum "S" | lb. | .0675 |
| Vinsol Resin | lb. | .025 / .035 |
| Vistac No. 1 | lb. | .20 / .214 |
| No. 2 | lb. | .214 / .227 |
| Witco No. 20, *l.c.l.* | gal. | .175 |
| X-1 resinous oil (*tank car*) | lb. | .011 / .016 |
| XX-100 Resin | lb. | .0525 |

**Softeners for Hard Rubber Compounding**

| | | |
|---|---|---|
| Resin C Pitch 45°C. M.P. | lb. | .01 / .016 |
| 60°C. M.P. | lb. | .01 / .016 |
| 75°C. M.P. | lb. | .01 / .016 |

**Solvents**

| | | |
|---|---|---|
| Carbon Bisulphide | 100 lbs. | 5.00 / 5.75† |
| Tetrachloride | gal. | .73 / .94† |
| Cosol No. 1 | gal. | .26 / .34 |
| No. 2 | gal. | .25 / .33 |
| No. 3 | gal. | .22 / .30 |
| GVL | lb. | 1.00 |
| Industrial 90% benzol (*tank car*) | gal. | .15 / .22 |
| Nevsol | gal. | .245 / .31 |
| Picco | gal. | .22 / .32 |
| Skellysolve | gal. | .071 / .105 |
| Tollac | gal. | .28 / .33 |

**Stabilizers for Cure**

| | | |
|---|---|---|
| Barium Stearate | lb. | .29 / .32 |
| Calcium Stearate | lb. | .26 / .27 |
| Laurex (*bags*) | lb. | .1475/ .1725 |
| Magnesium Stearate | lb. | .31 / .32 |
| Stearex, single pressed | lb. | 14½/ .15¾ |
| double pressed | lb. | 15¾/ .16¾ |
| Beads | lb. | .14¾/ .15¾ |
| Stearic acid, single pressed | lb. | |
| Stearite, *c.l.* | lb. | .14375 |
| Zinc Laurate | lb. | .29 / .32 |
| Stearate | lb. | .30 / .31 |

**Synthetic Rubber**

| | | |
|---|---|---|
| Chemigum N-1 | lb. | .53 / .60 |
| Hycar OR-15 | lb. | .50 / .65 |
| OR-25 | lb. | .45 / .60 |
| OS-10 | lb. | .45 / .60 |
| Neoprene Latex Type dry weight | | |
| 60 | lb. | .43 / .44 |
| 571 | lb. | .36 / .40 |
| Concentrated | lb. | .41 / .42 |
| 572 | lb. | .45 / .46 |
| Neoprene Type CG | lb. | .50 |
| E | lb. | .65 |
| FR-S | lb. | .65 |
| GN-A | lb. | .28 |
| KNR | lb. | .75 |
| Paraplex X-100 | lb. | 1.00 |
| Perbunan 26 | lb. | .48 |
| Synthetic 100 | lb. | .41 |
| "Thiokol" Type "A" | lb. | .45 |
| "FA" | lb. | .60 |
| ST | lb. | .66 / .76 |
| LP-2 | lb. | .85 |
| Water Dispersions ("Thiokol" Latex) dry weight | | |
| MF | lb. | .70 / .80 |
| MX-3112 | lb. | .65 / .75 |
| WD-2 | lb. | .75 / .85 |
| 3 | lb. | .75 / .85 |

**Tackifiers**

| | | |
|---|---|---|
| B.R.H. No. 2 | lb. | .015 |
| Piccolastic A-25 | lb. | .24 / .245 |
| Plastic | lb. | .12 |
| Ty-Ply Q | gal. | 6.75 / 8.00 |
| A | gal. | 6.75 / 8.00 |
| S | gal. | 6.75 / 8.00 |
| A | gal. | 6.75 / 8.00 |

**OUR REBUILDING PROCESS**

1. INSPECTED
2. DISASSEMBLED
3. REBUILT
4. MODERNIZED
5. GUARANTEED

STOUGHTON, MASS. · TRENTON, N. J. · AKRON, OHIO · LOS ANGELES, CALIF.
MACHINERY
L. ALBERT AND SON
NEW & REBUILT

**OUR NEW MACHINES**

MIXERS — MILLS
CUTTERS
SAFETY BRAKES
SUSAN GRINDERS
HYDRAULIC PRESSES
TRIMMERS
LIFT TABLES


# Classified Advertisements

Continued

## MACHINERY AND SUPPLIES FOR SALE

FOR SALE: 1—24x24" Hydraulic Press with 14" dia. ram. 1—18x18" Hydraulic Press with 10" dia. ram. 1—Royle No. 4 Perfected Tuber, with Variable Speed D.C. Motor. 3—30x24" Hydraulic Presses with 12" dia. rams. 1—5'x20' High Pressure Vulcanizer, 250 lbs. pressure, quick-opening door, with Seeley controls and all auxiliaries. 4—W. & P. Mixers, up to 625 gal. cap. 1—Allen No. 3 Tuber. 10—High-Pressure Hydraulic Pumps, up to 6,000 GPM. Dry Powder Mixers, Pulverizers, etc. Send for complete list. CONSOLIDATED PRODUCTS CO., INC., 13-16 Park Row, New York 7, N. Y.

"V" BELT MACHINERY
COMPLETE BELT-MAKING EQUIPMENT
Building Machines, Cutters, Slitters, Wrappers, Measuring Machines, Trimmers, Expanding Mandrels, Cord Latexers, and Driers. HOWE MACHINERY CO., INC., 30 Gregory Avenue, Passaic, N. J.

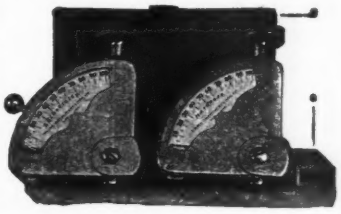
FOR SALE: EIGHT MOLDS—17½ x 17½"——FOR GROMMETS—81 cavity each. Sizes: ⅜", ½", 9/16", 11/16", ¾", 13/16", 21/32", and ⅝", and two top plates to fit the above molds. E. J. McCORMICK RUBBER CO., INC., 62 Bergen Turnpike, Ridgefield Park, N. J.

MOTORS FOR SALE: 50 H.P. G.E. TYPE—I FORM-K 440 V., 900 R.P.M., 3 Ph., 60 Cyc., $300.00. 15 H.P. Westinghouse Type-CW 550 V., 900 R.P.M., 3 Ph., 60 Cyc. with Drum Control and Grids (Like New), $300.00. 50 H.P. Westinghouse Type-CCL 440 V., 900 R.P.M., 3 Ph., 60 Cyc., $200.00. A. G. BRIGGS, 37 Rector Street, Newark 2, N. J.

3—ADAMSON 6" TUBING MACHINES; 1—EDGER 4¼" TUBING Machine; 1—Vulcanizer 5'x28'; 1—Masticator 30x30; 3—36" Mills, 3—Rubber Spreaders; 5—200-gallon Churns; 2—40-gallon Pony Mixers; 1—54" Calender; 4—Heel Trimming Machines; 1—60" Calender; 1—4-roll Outsole Calender 8x18"; 1—Experimental Mill; 1—72" Doubling Calender; 1—Span Grinder; 3—Embossing Calenders; 1—4-roll Rubber Washer; 1—2-roll Rubber Washer; 3—Mystic Toggle Presses; 1—Deane Hydraulic Pump 1"x6"; 1—Southwark Triplex Pump 3½"x12"; 1—Worthington Duplex Pump 12x4x12 stainless steel rods. Address Box No. 23, care of INDIA RUBBER WORLD.

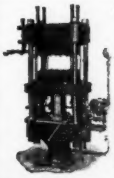

SPECIALIZING IN
**USED MACHINERY** FOR THE **RUBBER**
AND ALLIED INDUSTRIES
MILLS, CALENDERS, HYDRAULIC PRESSES,
TUBERS, VULCANIZERS, MIXERS, ETC.
ERIC BONWITT AKRON 8, OHIO

An International Standard of Measurement for—
**Hardness • Elasticity • Plasticity of Rubber, etc.**
Is the DUROMETER and ELASTOMETER (23rd year)
These are all factors vital in the selection of raw material and the control of your processes to attain the required modern Standards of Quality in the Finished Product. Universally adopted.
It is economic extravagance to be without these instruments.
Used free handed in any position or on Bench Stands, convenient, instant registrations, foolproof. *Ask for our Descriptive Bulletins, and Price List R-4 and R-5.*



THE SHORE INSTRUMENT & MFG. CO.
Van Wyck Ave. and Carll St., JAMAICA, NEW YORK
*Agents in all foreign countries.*

**New Rubber Spreaders**
**Churns, Pony Mixers**
**Saturators**
***Used – Rebuilt – Rubber – Chemical and Paint Machinery***
**LAWRENCE N. BARRY**
**41 Locust Street** **Medford, Mass.**



PLASTICS **MOLDING PRESSES**
*Plain or Semi-automatic—Any Size or pressure — Pumps, Valves, etc.*
**Dunning & Boschert Press Co., Inc.**
336 W. WATER ST. SYRACUSE, N. Y.

**GUARANTEED REBUILT MACHINERY**
IMMEDIATE DELIVERIES FROM STOCK
MILLS, CALENDERS, TUBERS
VULCANIZERS, ACCUMULATORS
UNITED
HYD. PRESSES, PUMPS, MIXERS
CUTTING MACHINES, PULVERIZERS
**UNITED RUBBER MACHINERY EXCHANGE**
319-325 FRELINGHUYSEN AVE. CABLE "URME" NEWARK, N. J


(*Classified Advertisements Continued on Page* 497)

**Vulcanizing Ingredients**

| | | |
|---|---|---|
| Magnesia, light (for neoprene) | lb. | $0.25 |
| Sulphur | 100 lbs. | 2.05 |
| Insoluble, 60 | lb. | .16 |
| Rubbermaker's commercial | 100 lbs. | 2.05† |
| Refined | 100 lbs. | 2.40† |
| Telloy | lb. | 1.75 |
| Tonox | lb. | $0.50 /$0.59 |
| Vandex | lb. | 1.75 |
| Vultac 1 | lb. | .38 / .45 |
| 2 | lb. | .38 / .45 |
| 3 | lb. | .42 / .49 |

**Waxes**

| | | |
|---|---|---|
| Antisol | lb. | .225 / .275 |
| Carnauba, No. 3 chalky | lb. | .7125 |
| 2 N.C. | lb. | $0.7675 |
| 3 N.C. | lb. | .735 /$0.745 |
| 1 Yellow | lb. | .8325 |
| 2 | lb. | .8125 |
| Carnube | lb. | .49 / .59 |
| Monten | lb. | .12 / .17 |
| Rubber Wax No. 118 | | |
| Neutral | gal. | .76 / 1.31 |
| Colors | gal. | .86 / 1.41 |

# AFRICA

A very successful rubber conservation and scrap rubber collection program has eased the rubber situation in South Africa to the extent that it has now become possible to relax restrictions prohibiting the use of scrap rubber. The restrictions on tire retreading have been eased, but the need of preserving rubber articles is still stressed, and destroying scrap rubber is still prohibited. The restrictions on the use of new tires for civilian purposes, however, are as severe as ever.

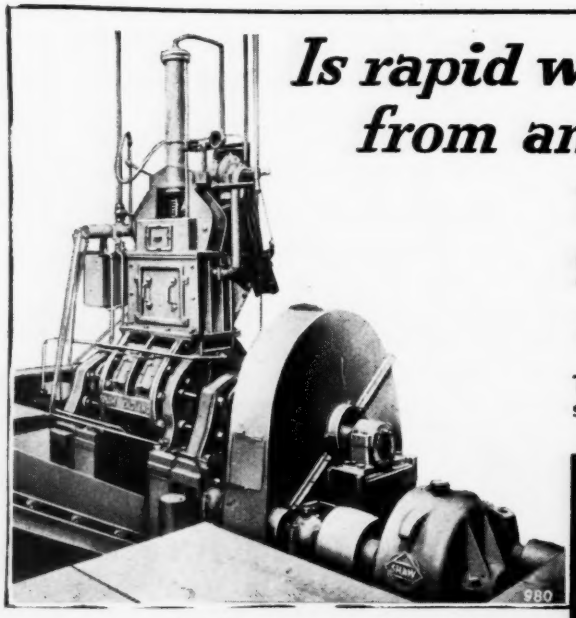
South Africa's geographical position and industrial facilities will make this territory a valuable advanced base of supply for the Far East when hostilities in Europe have ceased. Consequently the possibility of increasing South Africa's production of tires for military purposes is being studied by a group of rubber experts who arrived recently from the United Kingdom, India, Egypt, and the United States. It is understood that the United States has intimated its readiness to place at the disposal of South Africa tire manufacturers supplies of rubber for large-scale tire production.

British sources report that American rubber manufacturers have been offering South African importers essential goods, like hot-water bottles and syringes, made of rubber substitute which are claimed to be as good as or even better than prewar articles of natural rubber. Prices are said to have been reasonable; the two-quart bottle in the cheapest number is quoted at $36 per 100, ex factory. Rubber substitute tubes and insulated wires and cables have been offered by a Manchester firm of electrical goods manufacturers.

Belgian Congo is exporting rubber in increasing amounts and in 1943 shipped 8,000 tons of wild and plantation rubber to South Africa, where it was used chiefly in the manufacture of tires. This year it is expected the total will come to 10,000 tons, and as the rubber acreage has been more than doubled during the last two years, there should be a satisfactory increase also in the next few years. In 1942, 25,000 acres were under rubber; it is calculated that new extensions will bring this to about 60,000 acres in 1945.

# ARGENTINA

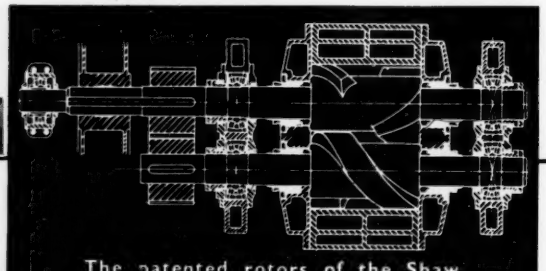
In Argentina it is proposed to produce a plastic similar to Bakelite or Ebonite from corn. Experiments in this direction are to be conducted by several organizations in collaboration including the General Industrial Department, the National Technological Institute of the Ministry of Agriculture, the Faculty of Industrial Chemistry and the National Littoral University. Laboratory experiments are expected to commence as soon as construction of necessary equipment is completed. An experimental plant on a semi-industrial scale will then be established after which it is hoped to be able to produce the plastic on a commercial scale.

*Is rapid wear inseparable from an Internal Mixer?*

The answer given by the
**SHAW INTERMIX**
is a definite negative

There are sound engineering reasons for this and we shall be glad to supply full particulars.



The patented rotors of the Shaw Intermix are mounted on roller bearings.

The illustration above shows the discharge side of a K.4 Intermix. A full range of machines is manufactured from the laboratory sizes up to the K.7 size for handling 360 lb. batches (Sp. Gr. 1.3).

SHAW

FRANCIS SHAW & CO. LTD. · MANCHESTER, 11 · ENGLAND

R.131C.

# Classified Advertisements

Continued

## MACHINERY AND SUPPLIES WANTED

WANTED BY A MANUFACTURER A BASE OR BED PLATE for No. 9 Banbury, also interested in purchasing a complete used, in good condition, No. 9 or 11 Banbury. Address Box No. 2, care of INDIA RUBBER WORLD.

WANTED: HERRINGBONE-GEAR REDUCTION UNIT OF 150 H.P., ratio of approximately 7 to 1; also Herringbone-Gear reduction unit of 100 H.P., ratio of approximately 7 to 1, by manufacturer in Boston area. Address Box No. 3, care of INDIA RUBBER WORLD.

WANTED: HYDRAULIC PRESSES. 6" to 14" RAM. STATE MAKE and particulars. PLASTIC PRODUCTS, Inc., 415 Lexington Ave., New York, N. Y.

WANTED: COMPLETE RUBBER PLANT EQUIPMENT, INCLUDing Mills, Presses, Pumps, W.&P. or Banbury Mixers, Screens, etc. Send complete description, location, and prices. Address Box No. 24, care of INDIA RUBBER WORLD.

WANTED: HYDRAULIC PRESSES WITH HEATED PLATENS, 150 tons and up, also Banbury Mixer, Vulcanizer at least 5' diameter, and other good equipment wanted for expansion program. Address Box No. 28, care of INDIA RUBBER WORLD.

## Where Needs Are Filled

The Classified Ad. Columns of INDIA RUBBER WORLD bring prompt results at low cost.


## RUBBER MACHINERY WANTED:

**Banbury Mixer 3A**

**Three Roll Calender 20 x 54**

**Four Roll Calender 12 x 24**

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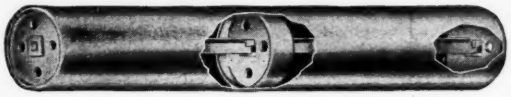

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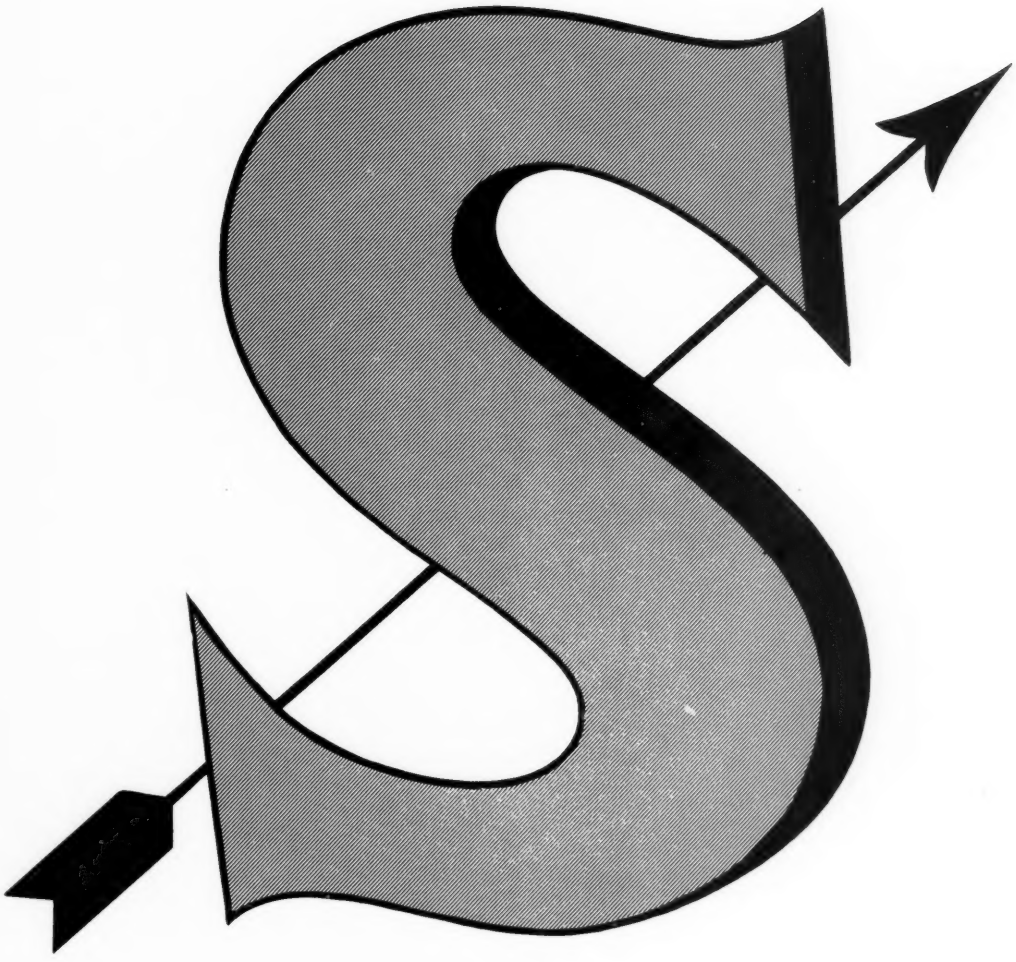

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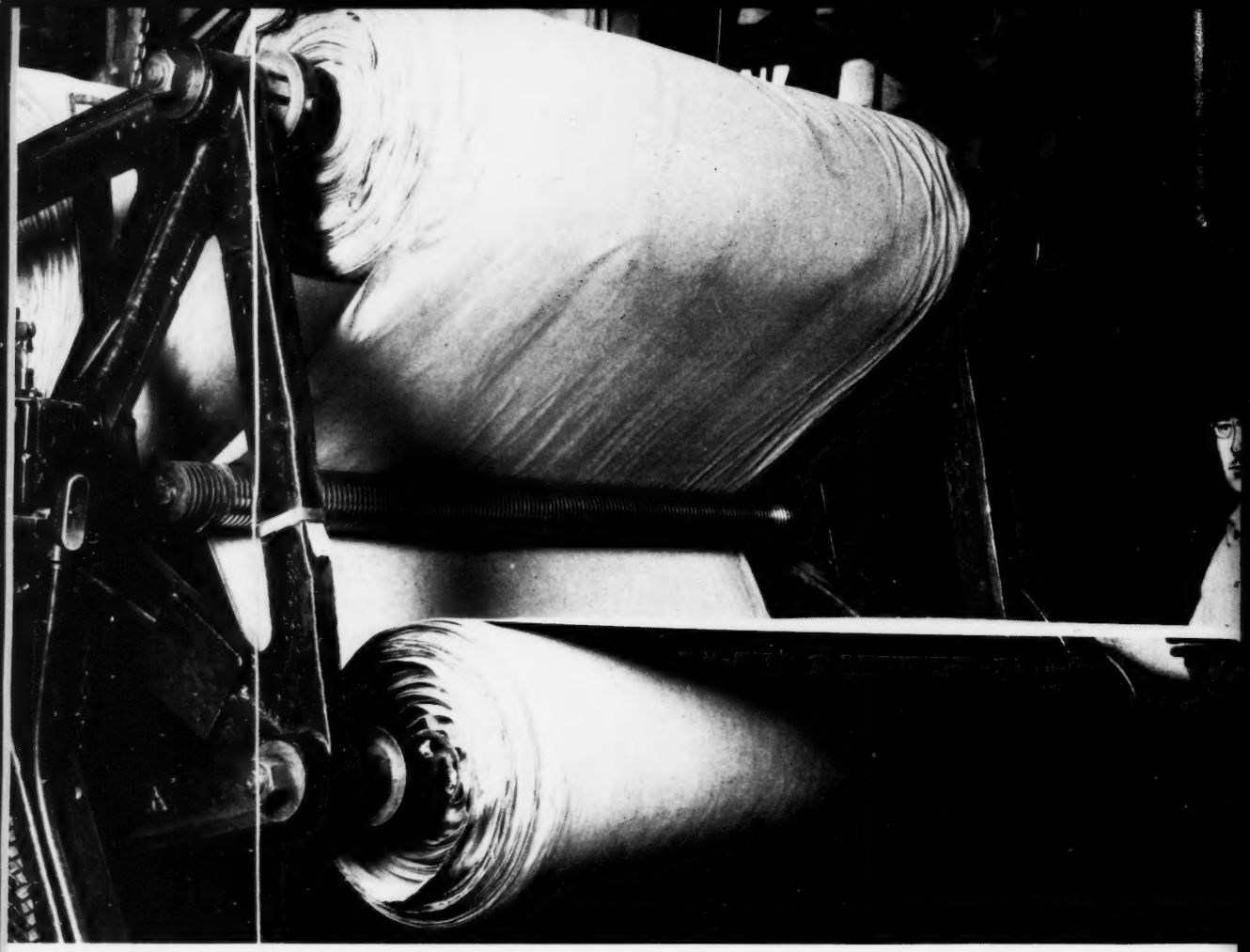

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